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SOVIET ECONOMIC DEVELOPMENT: 1928-54

PART I. NATIONAL ACCOUNTS ANALYSIS

This report was prepared as part of the US contribution to a NATO study comparing economic trends in the Free World and the Sino-Soviet bloc. The other two parts of the study which relate to the Soviet Union are: Part II, Manpower and Physical Production and Part III, Foreign Trade.

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NOTE

In addition to periodic revision of the estimates of Soviet GNP and its principal components, the US intelligence agencies are currently reexamining in detail Soviet military expenditures. The results of this re-examination, which will not be available until Spring 1956, may require revision of the figures presented in this report.

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SOVIET ECONOMIC DEVELOPMENT: 1928-54

PART I. NATIONAL ACCOUNTS ANALYSIS

I. Introduction

This report sets forth in detail two US Government estimates of the Soviet Gross National Product (GNP) and its components. One of these estimates is hereafter referred to as Estimate A; the other is referred to as Estimate B.

Both estimates use the US Department of Commerce concept of gross national product and build up Soviet national accounts by following the general procedures developed by Abram Bergson and his associates. ^{1/} Both estimates deviate from Bergson's estimate because of different interpretations of what constitutes factor cost and different assessments of specific magnitudes (e.g. military expenditures). Both estimates, finally, go beyond Bergson's statistics by producing a continuous series from 1948 to 1954 while Bergson's national income data for 1937, 1940, 1944, and 1948 are as yet unlinked. They also convert the ruble figures into dollars and add data on various important magnitudes such as the relation of capital stock to annual investment, consumption broken down by product as well as by social group, etc.

The two estimates, on the other hand, differ in some important respects from each other. The pivotal year upon which the statistical series hinge in Estimate A is 1948, whereas for Estimate B the base year is 1951. In converting market prices into factor cost, both estimates differ from the Bergson analysis, which eliminates the entire turnover tax; however, Estimate A considers only a small portion of the tax revenue as the counterpart of a factor cost (viz., land rent), while Estimate B reallocates the entire turnover tax to account for land rent and other economic rents.

^{1/} See Abram Bergson and Hans Meymann, Soviet National Income and Product 1940-1948, New York, 1954; also published as Rand Report R-253, June 1953.

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Both estimates have merits of their own, and, what is more significant, both express the same general image of the Soviet economy. Since they provide a fairly reliable check on each other, it was considered useful to present both of them. Accordingly, a brief analysis of the methods used in the two estimates, together with a discussion of their specific differences, is presented in Section II. This is followed by a general survey of Soviet economic development since 1928 (Section III) which (a) describes the main trends in the Soviet economy reflected in the two GNP estimates despite differences in statistical detail and (b) summarizes the principal growth rates derived from these estimates. Section IV consists of a more detailed presentation of Estimate A and Section V is a similar presentation of Estimate B. 1/

II. Methodology of Soviet National Accounts Analysis

A. GNP in Market Prices

The Soviet Government has never published statistics on the gross national product of the USSR. From time to time it has released figures on what Soviet officials call "national income," 2/ but no fruitful method has been devised to correct or adjust these data to make them more reliable. 3/

1/ Detailed discussion of certain aspects of both estimates are presented in the appendices. Appendices A-E inclusive concern Estimate A; Appendices F-G concern Estimate B.

2/ For example, data in absolute terms for 1928-1935 are published in Sotsialisticheskoye Stroitelstvo SSSR (Socialist Construction in the USSR), Moscow, 1936. Some isolated data for the 1936-40 period have been published in Narodny Khozyaistvenny Plan na 1937 God (National Economic Plan for the year 1937) Moscow, 1937; in the Third Five-Year Plan published by Gosplan in 1939, in N. A. Voznesenski's pamphlet Growing Prosperity of the Soviet Union, New York, 1941; and in the restricted Gosudarstvenny Plan Razvitiya Narodnogo Khozyistva SSR na 1941 God (State Plan for the Development of the National Economy in 1941), Moscow, 1941. Percentage data, and occasionally statistics in absolute terms, have been published for postwar years in the Soviet press.

3/ The principal difficulties encountered in using Soviet national income data are the following: (a) the figures are based on the Marxist concept of national income, which excludes all economic activity not directly related to material production; (b) the official Soviet data are subject to an inherent technical upward bias arising from the use of so-called 1926/27 rubles in determining the value of output in subsequent years; (c) no official price indexes have been published since 1930, (d) the Soviet Government recently substituted 1950/51 wholesale prices for 1926/27 rubles, and (e) the percentage relationships of Soviet national income in different years which the USSR typically publishes are either inconsistent or lead to conclusions that are patently incorrect.

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Accordingly, official Soviet national income statistics could not be used in this report as a point of departure for estimating the postwar gross national product of the USSR.

Recent academic research on the Soviet economy has produced a variety of estimates of the size, composition, and rate of growth of the Soviet GNP. In all cases, the fundamental problem is the scarcity of statistical data which can be used to build up the national accounts and to estimate the breakdown of the total Soviet GNP by sector of origin and by use category. This problem also affects the two US Government estimates presented herein, despite the fact that intelligence information has been used in preparing these estimates.

The point of departure for both estimates is the calculation of Soviet GNP in market prices for the base year (1948 in Estimate A, 1951 in Estimate B). This was done by building up a GNP total conceptually comparable to the gross national product as defined by the US Department of Commerce. Following Bergson, two consolidated accounts were set up -- one for households and one for government organizations. ^{1/} Incomes and outlays in each case were calculated and a separate estimate was made for depreciation. The income accounts, together with depreciation, were combined to get a total GNP figure, which was cross-checked against the total obtained by summing the consolidated outlay accounts (see Table 1).

The various income and outlay items in the household and government accounts were allocated among four major use categories: (1) consumption, including communal services, (2) gross investment, (3) military outlays, including those not covered by the defense appropriation in the Soviet budget, and (4) government administration. While this was done for the GNP figures in market prices for the base year, the calculation for all other years was made initially in terms of factor cost. A time series of total GNP in market prices is derived indirectly in Estimate A and the results, including a breakdown by use, are presented in Appendix A. A similar series is not developed in Estimate B, but a consumption index in market prices is presented in Appendix G.

B. GNP At Factor Cost

The determination of factor costs in the USSR presents many difficult problems. Soviet indirect taxes (notably, the "turnover tax") have represented the bulk of government budget receipts and 20 to 30 percent of the GNP since the early 1930's. In addition, capital goods and defense industries received large subsidies from 1928 to 1936, during the Second World War, and after the war at least up to 1950. Subsidies

^{1/} There is no business sector in the USSR since all productive units are, in effect, government agencies.

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Table 1. ESTIMATED SOVIET GNP IN MARKET PRICES

	Estimate A a/ Year 1948 in billion 1948 rubles	Estimate B b/ Year 1951 in billion 1951 ruble
<u>INCOME</u>		
Current income of households	500.5	635.6
Consolidated net income of government, social and economic organizations	286.2	410.2
Net national product	786.7	1045.8
Depreciation	24.5	29.8
GROSS NATIONAL PRODUCT	811.2	1075.6
<u>OUTLAYS</u>		
Total outlays of households	470.8	600.5
Consolidated total value of goods and services disposed of by government, social and economic organizations, exclusive of sales to households	340.4	475.1
GROSS NATIONAL PRODUCT	811.2	1075.6

a/ See Section IV for further details.

b/ See Section V for further details.

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to individual ministries are still prevalent today. There are also implicit subsidies owing to the Soviet practice of disregarding interest and, to some degree, depletion and obsolescence in the determination of price. Multiple prices, particularly for foodstuffs, create another divergence of factor cost and market prices.

The principal function of the turnover tax is to equilibrate the level of consumer disposable incomes with the available supply of consumers' goods. Thus it does not have the same function as do indirect taxes in Western countries. In the USSR, the government sets the output plan for consumers' and producers' goods and the level of money wages. Prices are set in a manner roughly consistent with the above variables and do not have a direct effect on output. There is therefore no reason why market prices of consumers' goods and factor costs entering into their production should tend toward equality.

Another problem involves the treatment of profits. To some extent industrial and trading profits are monopoly profits in the Soviet Union. However, profits are generally higher in consumers' goods industries than in industry as a whole and the bulk of these profits is not retained by the consumers' goods industries. These considerations suggest that, in the USSR, profits play the same role as the turnover tax.

In attempting to measure factor costs in the USSR, Bergson removed the estimated turnover tax receipts from each sector of origin and end use of the GNP, added subsidies, and adjusted for multiple prices. These adjustments greatly reduce the value of consumption and increase the value of investment and defense. Similarly, the agricultural sector is also greatly reduced in relation to the other sectors of origin, since most consumers' goods are of agricultural origin. It is believed that this procedure results in the exclusion of certain factor costs which should be retained when the Soviet GNP is compared with that of Western countries. 1/

The measurement of these excluded factor costs involves many arbitrary judgments. All turnover tax receipts and monopoly profits of the government may be viewed as economic rent which stems from the government's power to determine production and to set wages and prices. The magnitude of this economic rent is a result of over-all economic policy, the degree to which consumers' goods production lags behind the production of capital goods, and the prevailing practices regarding production incentives of farmers. In order to measure this economic rent and to impute all or part of it to particular sectors or end-uses of the Soviet economy, it is necessary to recast the Soviet national

1/ It might be noted that Soviet writers have expressed the view that at least part of the turnover tax represents the value of land rent. Soviet farms are forced to sell a large part of their output to the government at fixed prices far below the market prices. These delivery quotas are also set so that farms with good land carry a heavier burden than farms with poor land.

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product in accordance with a Western conceptual and institutional framework. Not to do so would result in highly misleading international comparisons. Two alternative methods of allocating this economic rent were used in this report.

The first method, which is used in Estimate A and described in more detail in Section IV, allocates to the agricultural sector of the GNP the portion of the turnover tax believed to represent differential land rent. The value of output of the agricultural sector, measured in terms of factor cost, is therefore less than the market value of this output but more than the value of agricultural output when the entire turnover tax is excluded. Similarly, consumption is less than that indicated by a breakdown of Soviet GNP in market prices, but in terms of factor cost consumption is increased to a greater extent than other end uses. The rest of the turnover tax is not considered to be factor cost but rather monopoly profit. The conceptual basis for this adjustment is that (1) a socialist government would regard land rent as a factor cost in determining an optimum allocation of resources, and (2) in the Western countries with which the USSR is to be compared land rent is actually paid, while the analogs of the other Soviet types of economic rent are often not paid in Western countries since they stem from the USSR's particular institutional system.

The second method, which is used in Estimate B and described in more detail in Section V, reallocates the entire turnover tax. Two-thirds of this tax goes to agriculture and the rest is distributed among the other sectors in proportion to the value added by each sector (excluding tax). This procedure is based on the belief that no distinction should be made between differential land rent and other types of economic rent within the Soviet institutional framework, and that the part of the turnover tax which is allocated to non-agricultural sectors corresponds roughly to the unpaid value of interest, obsolescence, and depletion. Agriculture receives most of the turnover tax because, viewing land as a fixed factor, a high rent may be imputed to it as long as agricultural products are scarce in relation to money incomes.

These adjustments make the sectors and end uses of the GNP more nearly comparable to those of Western countries. In this respect, statistics on the Soviet GNP in terms of factor cost are preferable to similar statistics in market prices. It must be recognized, however, that the adjustments cannot be made with certainty and necessarily involve guesswork. Consequently, differences in results are inevitable. The main quantitative differences which result from the alternative methods may be summarized as follows:

1. The ruble value of total GNP at factor cost is smaller under the A method than the B method.
2. Agriculture is given a smaller weight in the total GNP in Estimate A than in Estimate B.
3. Consumption, which includes most of agricultural production, is also given a smaller weight in Estimate A.

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C. GNP in Constant Rubles

1. Sector of Origin. Time series for GNP in constant rubles were obtained by calculating quantity indexes for each sector of origin and computing weighted averages of these indexes. The construction of the quantity indexes for sectors of origin involved the selection of production time series for individual commodities and the selection of weights to be used in averaging these series. The ideal weights would, of course, be value added weights, and the ideal base year a fairly typical year of the period in question. Because of the scarcity of data, however, it was necessary to resort to more or less satisfactory expedients.

Estimate A used for this purpose sector indexes based on the Hodgman industrial output index, the Shimkin mineral consumption index, and the physical freight turnover index for industry, construction, and transportation. Estimate B uses the same indices for prewar years, but calculates independent estimates of commodity output for postwar years. Both estimates used detailed farm output indexes in calculating their respective agricultural series; for the services index they used selected employment data and, in the case of trade, deflated turnover values (Estimate A) or consumers' goods output figures (Estimate B).

The indexes representing the movement of sectors of origin through time were then combined into an index of GNP. The weights used were estimated value added (principally payrolls plus depreciation) in a base year. In Estimate A, Bergson's value added estimates by sector for 1937, moved by means of quantity indexes to 1948, served as the base. In Estimate B, 1951 employment, 1941 plan wages, and estimated depreciation allowances were used.

2. Use Pattern. Estimates of end-uses in constant prices were obtained by deflating some data given in current rubles (e.g. explicit military expenditures) and using available data given in constant prices (e.g. centralized investments). Quantity indices were used as cross-checks whenever possible. Although methodological details and estimates of particular components differ slightly, the A and B versions show very similar growth rates for each end-use.

Consumption was treated as a residual in both estimates in order to attain consistency between the end-use and sector of origin measures of the GNP. Indexes of consumption computed independently on the basis of consumers' goods production or of deflated consumer expenditures indicate a substantially larger rise in Soviet consumption in the 1948-54 period than is obtained by this residual method. This discrepancy is believed to be due to differences in the weighting of consumers' goods categories. The independently computed indexes use market price weights which, because they include practically all the turnover tax and profits of consumers' goods industries, give a very large weight to fast growing consumer manufactures and processed foods. In the residual index, on the other

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hand, consumption items are implicitly given factor cost weights and in the factor cost estimates most or all of the turnover tax has been removed from the manufacturing portion of consumption, which increases rapidly, and transferred to the slow growing agricultural sector.

It is impossible to tell which measure of consumption best reflects the actual growth in Soviet living standards. Accordingly, both measures are shown, the residual measure as part of the allocation of the GNP by end-use, and the market price measure separately.

D. Conversion of the Soviet GNP into Dollars

The conversion of the Soviet GNP into dollars is subject to all the difficulties inherent in international comparisons. In addition, there is no meaningful market exchange rate, and it is impossible in the Soviet case to make a study of comparative production and prices as exhaustive and detailed as the Gilbert and Kravis study for the OEEC. ^{1/}

In effect, any conversion of the Soviet GNP into another currency involves comparing two different baskets of goods. In certain narrowly defined areas of the economy comparisons based on a single average basket are meaningful, but this is not the case for broad economic categories which include widely different types of productive activity. The basic problem of ruble-dollar conversions, or of any international comparison of Soviet GNP, may therefore be described as follows:

If the comparison is made in terms of physically similar baskets of goods, priced in one or the other currency, it is implied that a basket performs the same economic function in both countries. This is evidently not true. Differences in factor endowment, production structure, and demand cause the uses of many of the same goods and their utility or productivity in alternative uses to be different. The same goods therefore tend to be produced in very different proportions in the two countries.

If, on the other hand, different baskets of goods are compared, there is no objective basis for determining how many baskets of one type are equivalent to a basket of another type, or what two equivalent baskets consist of. In fact, the meaning of the term "equivalent" is highly ambiguous and depends on the type of criterion selected for the purpose (i.e., whether consumer welfare, military effectiveness, etc.). Arbitrary judgments are therefore unavoidable.

^{1/} See M. Gilbert and Irving Kravis, An International Comparison of National Products and the Purchasing Power of Currencies, OEEC, Paris, 1954.

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There is, of course, no ideal way of converting the Soviet GNP into dollars. All methods are subject to the difficulties described above. Two alternative methods are presented in this paper and are described more fully in Sections IV and V.

Generally speaking, according to the method used in Estimate A, representative baskets of goods in each category of the end uses of GNP are priced in rubles and in dollars. An exchange rate is thus obtained for each category. The market baskets selected are of a mixed nature -- they include goods which are important in the USSR and others which are important in the US -- but in general they are more typical of the USSR than of the US. Exchange rates by end-use are the weighted averages of the category exchange rates, the weights being the appropriate share of the Soviet consumer budget in the case of consumption, and estimated Soviet value added shares in the case of investment and defense. Total GNP in dollars is then obtained by adding up the dollar values of the end-uses.

In Estimate B, two sets of ruble-dollar ratios are computed for each sector of origin and end-use, one for the US basket of goods and one for the Soviet basket of goods. Sub-sector and use-category ratios are averaged into sector exchange rates and end-use exchange rates by using as weights the value added or value of production respectively in the sub-sectors or use categories in the base year (1951). In a similar manner, two exchange rates are obtained for the total GNP, one for the Soviet market basket weighted by the Soviet distribution of output by end-use, the other for the US market basket weighted by the US distribution of output. The exchange rates actually used are the arithmetic means of the above pairs of rates.

In both estimates, the ruble-dollar ratios computed for the base year were used to move the time series of GNP and its components. It should be noted that the different calculations of factor cost in the two versions do not affect the dollar conversion, except through the weights assigned to individual sectors or uses. Differences in implicit ruble-dollar ratios are offset by differences in the GNP rubles figures in terms of factor cost.

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III. General Survey of Soviet Economic Development

A. Growth of the GNP.

The results of the two estimates, despite differences in detail, depict the same general development of the Soviet economy over the past quarter-century. The calculated Soviet GNP in 1954 is approximately three times as large as in 1928, which is equivalent to an average rate of growth during the entire period 1928-54 of roughly 4 percent per annum. This computed rate of growth is, of course, affected by the loss of resources and the considerable decline in total output during the war years. It does not represent the "normal" long-range rate of growth for the USSR.

Whether Soviet economic development to date provides any indication of a long-range growth rate that could be regarded as normal or typical is an open question. Actually the Soviet people knew little normalcy throughout the quarter century 1928-54. The constant feature of Soviet economic development was the determination of the Soviet leaders to strengthen the economic bases of the USSR's political and military power through the forced development of heavy industry. Normal in that sense was the industrialization period 1928-37, for which both estimates calculate a rate of growth of about 6 percent per annum. Not normal were the years 1937-40 even though the GNP happened to grow by a similar annual average percentage. The growth rate in this latter period reflects the balance of two extraneous influences: economic and military mobilization (in particular, a lower rate of investment because of a larger military outlay) reduced the rate of growth for comparable areas, while the annexations of 1939-40 expanded the wealth and income of the USSR. Not normal were, of course, the war years when the Soviet national product hit rock bottom and the following years when it bounced back.

After 1950 the growth rate was about 6.5 percent per annum, a rate considerably below the 10 percent of the rehabilitation period but high compared with Western countries. It is that high because of heavy investment, intense exploitation of capital and labor resources, and educational and technological progress; moreover, it is likely to continue on a high though declining level. The factors that may cause some levelling off in the predictable future are smaller increments to the labor force, a larger share of replacements in gross investment, and the urgently required shift of investments from the highly reproductive equipment field to less reproductive housing and civic facilities.

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B. Sector of Origin

A comparison of the two estimates in terms of the growth of the GNP sectors, agriculture, industry-construction, transportation-communications, and services, and their relative shares in GNP is shown in Table 2. Differences between the two estimates of the movement of these sectors and GNP are moderate. While there are significant differences in the calculated shares of agriculture and industry, the two estimates agree that the former's share in the total GNP has consistently declined and that in recent years industry has contributed more to that total than has agriculture. In a general sense, Estimate A portrays the Soviet economy as somewhat more industrialized, whereas in Estimate B the role of agriculture is more pronounced over a longer period of time. Both estimates indicate, however, that industry has grown much more rapidly than agriculture.

i. The Prewar Period. During the prewar period, Soviet industry was built up by a tour de force while agriculture underwent a severe crisis. As is well known, Soviet agriculture was collectivized in the face of strong peasant resistance; a large portion of livestock was lost in the process, millions of peasants migrated to cities, and though they had been underemployed on the farms their migration upset the rural routine. Between 1928 and 1932 agricultural output actually fell by some 25 percent. Then, as the countryside quieted down and farm machinery began to make up for the loss of manpower and draft animals, production rose again until, in 1937, it was about 20 percent higher than in 1928. It must be remembered, however, that the crop had been poor in 1928 and was unusually good in 1937. It is this combination of factors that brought about the phenomenon of greatly improved agricultural labor productivity in 1937 as compared with 1928.

Industry and construction increased their output from 1928 to 1937 by an estimated 13 percent per annum. This reflects a balance between the extremely fast growth of heavy industry, the slower development of large-scale consumers' goods industries, and the languishing output of small factories and workshops. The concentration of investment where it yielded most -- i.e. in equipment of producers' goods industries -- and the fast absorption of advanced capitalist production techniques paid dividends. But it was inevitable that the process should have been accompanied by enormous growing pains. The non-agricultural labor force expanded rapidly and it took some time before the workers and managers mastered the techniques of modern mass production. During the First Five-Year Plan industrial labor productivity per man-hour did not grow at all, despite large-scale introduction of modern machinery; during the Second Five-Year Plan the quality of labor and management improved greatly and many unfinished investment projects were finally completed, with the result that industrial labor productivity per man-year increased considerably in the five years 1932-37.

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Table 2. COMPARISON OF ESTIMATES A AND B:SOVIET GNP BY SECTOR OF ORIGIN

	GNP		Agriculture		Industry, Construction		Transport, Communications		Services, Trade	
	A	B	A	B	A	B	A	B	A	B
<u>Indexes: 1948=100</u>										
1928	51	57	102	89	26	27	23	21	43	51
1937	88	92	117	108	81	81	81	79	72	83
1940 <u>a/</u>	106	107	131	121	91	101	93	92	104	96
1948	100	100	100	100	100	100	100	100	100	100
1949	111	109	109	105	115	117	115	116	105	106
1950	122	122	119	116	132	133	132	130	110	112
1951	130	130	114	114	149	153	148	145	115	119
1952	140	142	123	128	164	175	161	159	118	123
1953	147	147	118	121	181	189	174	179	122	129
1954	157	156	122	124	199	207	188	187	126	136
<u>Annual Growth Rates</u>										
1928-37	6.2	5.4	1.5	2.1	13.4	13.0	15.0	15.8	5.9	5.6
1937-40 <u>a/</u>	6.3	3.9	2.1	2.1	3.9	7.6	4.7	5.2	13.0	5.0
1948-50	10.6	10.6	9.1	7.7	15.1	17.4	15.1	14.0	4.8	5.3
1951-54	6.5	6.3	0.9	1.7	10.7	10.6	9.2	9.5	3.7	5.2
1948-54	7.8	7.7	3.4	3.7	12.0	12.8	11.0	10.9	4.1	5.3
1928-54	4.4	3.9	0.7	1.3	8.1	8.2	8.4	8.7	4.2	3.8
<u>Percent of Total</u>										
1937	100	100	36	40	34	31	8	7	22	21
1940 <u>a/</u>	100	100	34	41	32	28	7	6	27	25
1948	100	100	27	36	37	29	8	7	27	28
1949	100	100	27	34	38	31	9	7	26	27
1950	100	100	26	34	40	33	9	7	25	26
1951	100	100	24	31	42	36	9	7	24	26
1952	100	100	24	32	43	36	9	7	23	24
1953	100	100	22	29	45	38	10	8	23	25
1954	100	100	21	29	47	39	10	8	22	25

a/ Includes acquired territories.

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Soviet industry continued to expand its output after 1937, but at a slower pace than in the period 1928-37. This slower growth reflects primarily the diversion of resources to military production and the retarding effect of conversion to a war footing.

The addition to Soviet economic potential from the annexed areas was small since the new territory contained little industry and, on the whole, poor farm land. A comparison of the 1937 national product (old frontiers) with the 1940 national product (with annexed areas) shows an increase of about one fifth, which corresponds to an annual growth of a little more than 6 percent. Despite the annexed agricultural regions, the share of farm production in the GNP dropped slightly, chiefly because the 1940 crop in comparable territory was far below that of 1937.

2. The Postwar Period. No estimate is made in this report of the Soviet GNP during the Second World War, but it is generally recognized that at the low point in 1942-43 the GNP was not more than about two-thirds of the 1940 level. Recovery was quite rapid in the sense that total production almost regained the 1940 level by 1948; however, reconstruction was not completed by that time and all sectors of the economy had not regained their prewar level of output.

The invaded territory of the USSR had not been fully rehabilitated while industrial facilities farther to the East were developed beyond the prewar level. Thus, in 1948, the industrial sector was producing about 10 percent more than in 1940 whereas agricultural production was still below the 1940 level. In the period 1948-50, damaged installations were still being repaired and land brought back into cultivation, demobilized soldiers and liberated prisoners were put to work, enemy property and enemy labor were exploited for reconstruction and expansion, and additional Lend-Lease machinery was installed. All these extraordinary factors, together with favorable weather and a consequent spurt in agricultural production, brought about a rise of the GNP by an annual average rate of more than 10 percent.

Since 1950, however, the old cleavage between industrial and agricultural development, has once again become very pronounced. In the years 1951-54 farm output was at best 4 percent above and at worst 4 percent below the 1950 level, and at the end of that period it was for all practical purposes the same as in 1950. Industrial output continued to increase, though at a somewhat slower pace than in previous years; in one year, 1953, it faltered somewhat, apparently because of changes in planning and organization. In transportation the deceleration in growth rate was quite marked; in contrast to the 1930's this sector has recently expanded more slowly than industry, which may be the result of economy measures, of difficulties in supplying the desired service, or both.

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C. The Use Pattern

Table 3 summarizes the growth of the end-uses and the use patterns indicated by the GNP figures developed in Estimates A and Estimate B. The salient feature of these use patterns is the subordination of consumption to investment and military outlays.

1. The Prewar Period. Between 1928 and 1937 consumption in constant rubles appears to have grown by at most 25 percent. This latter figure does not seem unfavorable when compared with a population increase of 9 percent, but the picture is entirely different when the profound changes that consumption underwent are considered. The city population doubled in this period; urbanization and industrialization not only produced new basic consumers' needs that did not exist in rural surroundings, but compelled many consumers to purchase what formerly they themselves had produced at home. Thus while consumption, measured in terms of national accounts, increased somewhat, the individual Soviet citizen fared worse in housing, diet, and clothing in 1937 than in 1928 and possibly even worse than in 1913. No series for investment and defense was computed for the years 1928-37 because of the difficulty in interpreting the changes in capital goods prices.

Between 1937 and 1940 there was a marked increase in the share of the GNP devoted to military purposes. Since there was no durable consumers' goods industry to speak of, the country could not arm by changing from automobiles, refrigerators, and the like to tanks and guns. The conversion took place at the expense of investment. Both estimates agree that investments and defense expenditures combined absorbed roughly 30 percent of the GNP in 1937 and in 1940; but in the former year investments alone represented 20-21 percent of the GNP, in the second year 14-15 percent, whereas military expenditures were 7-8 percent in 1937 and double that percentage in 1940. As a result of the lower investment rate and of the disturbance produced by conversion, mobilization, and military events the growth of the national product of the USSR (comparable boundaries) declined to an estimated 3.4 percent per annum. Total consumption grew also during this period, but somewhat less than the national product. Since the Soviet population in 1940 was about one fifth larger than in 1937, per capita consumption actually declined by several percent from the already austere level of 1937.

2. The Postwar Period. As indicated in Table 3, the share of consumption in the total GNP in 1948 was less than in 1937 and 1940, whereas the share of investment was more. Military outlays in 1940 were, of course, relatively high and the comparatively small percentage of total GNP devoted to investment in that year reflects the greater stress on preparedness.

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Table 3. COMPARISON OF ESTIMATE A AND B: SOVIET GNP BY END USE

	Consumption		Investment		Military Outlay		Administration	
	A	B	A	B	A	B	A	B
<u>Indexes: 1948=100</u>								
1928	---	83	---	---	---	---	---	---
1937	103	104	81	---	52	---	44	---
1940	120 <u>a/</u>	105 <u>b/</u>	66	---	126	---	59	---
1948	100	100	100	100	100	100	100	100
1949	111	108	111	116	112	106	102	102
1950	121	119	129	137	123	117	105	104
1951	123	126	139	145	133	136	108	106
1952	134	137	156	159	152	153	111	108
1953	140	138	167	173	157	158	112	110
1954	148	143	187	199	160	157	112	112

Annual Growth Rates

1928-37	---	2.6	---	o/	---	---	---	---
1937-40	3.9	---	-(6.9)	---	34.4	---	11.0	---
1948-50	10.2	9.0	13.5	17.0	10.8	8.2	2.3	2.0
1951-54	5.2	4.7	9.8	8.4	6.9	7.3	1.7	2.0
1948-54	6.8	6.2	11.0	12.2	8.2	7.8	2.0	2.0
1937-54	2.1	1.9	12.0	---	7.6	---	5.6	---

Percent of GNP

1937	68	70	21	20	8	7	2	3
1940	66	69	14	15	17	13	3	3
1949	58	64	23	23	14	10	4	3
1950	58	63	24	24	14	10	4	3
1951	57	63	24	24	14	10	4	3
1952	56	62	25	24	15	11	4	2
1953	55	61	26	26	15	11	3	2
1954	55	60	27	28	14	10	3	2

a/ Including acquired territories.b/ Excluding acquired territories.c/ Annual decrease.

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In real terms consumption rose about as fast as the national product during 1948-50, i.e. by about 10 percent per annum. This is unusual under Soviet conditions but is reasonable in the light of conditions immediately following the war. In 1948 aggregate consumption was smaller, and investment plus defense expenditures were larger than in 1940; two years later total consumption was up to the 1940 level, but per capita consumption was still below prewar. These increases in 1948-50 were unavoidable concessions that had to be made to the populace. In 1946 there had been clear-cut signs that the extremely low level of consumption immediately after the war adversely affected morale and productivity; while no quantitative estimate has been made of the growth in aggregate or per capita consumption in 1946-47, it is very likely that the supply of consumers' goods during these years increased even more rapidly than in 1948-50. However, since the average Soviet citizen was still not as well off as before the war, and since his expectations had probably increased, a continued rise in consumption was necessary to keep up morale and productivity.

By 1950, however, the Soviet leaders apparently felt that sufficient concessions had been made and that power considerations should again prevail over welfare considerations. Investment and military outlay were given their traditional advantage in the allocation of resources. These resources, in addition, increased less rapidly than during reconstruction. Now that labor and capital was again as fully utilized as Soviet institutions and policies permitted, the growth rate of the national product slowed down to an annual average (1950-54) of about 6.5 percent. This is still a remarkably high rate as compared to Western countries, but was achieved through the following means and in the face of the following difficulties;

The means are, first of all, a high and growing share of investments, which represented some 24 percent of the GNP in 1950 and 27 percent in 1954. Investments continued to be concentrated in producers' goods industries, i.e. where they reproduced themselves rapidly. Consumers' goods industries and housing received lower priorities and, until recently, the same was true of agriculture. In 1953, for instance, industry received 47 percent of all centralized investments and of industrial investments only about 9 percent was devoted to light industries (including food industries) and very little to housing. The share of agriculture was but 15 percent of all centralized investment.

In addition to increased annual investment, the USSR has continued to utilize its capital stock very intensely. Stand-by reserves and inventories are small by US standards. Moreover, practically all additions to the labor force are channeled into high productivity jobs in the industrial sector of the economy. Participation of the population in the labor force is high and the official work-week has continued since 1940 at 48 hours.

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While the aforementioned factors explain why the Soviet GNP has risen fast in comparison to most Western countries, there have been three main deterrents to an even faster growth: One is purely institutional, viz. the retarding influence of a bureaucratically managed economy. The second has to do with another basic feature of Soviet policy: the stress on preparedness had lead to devoting a high proportion of national resources to military use, i.e. to an entirely unproductive expenditure. The third drag on Soviet economic development is the poor state of its agriculture. Weather has played a role in the unsatisfactory development of agriculture in the past four years, but the basic reasons are institutional and economic - viz. a farm system that does not provide sufficient incentives to the peasantry, the disrupting impact of the kolkhoz mergers in 1950-51, an erratic agricultural policy in general, poor farm management, and technological backwardness.

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IV. Soviet Gross National Product: Estimate AA. Soviet GNP in 1948

The year 1948 was selected as the base year in Estimate A because it was expedient to use the latest year for which national accounts had already been set up by Bergson and his associates. ^{1/} Apart from this consideration, there are both advantages and disadvantages in using 1948 as the base year. On the one hand, information pertaining to 1948 is less scarce than for more recent postwar years; moreover, in 1948 the USSR almost reattained the prewar level of output. On the other hand, the 1948 price system, with its high subsidies for producers' goods and its particularly heavy turnover tax on consumers' goods was abandoned shortly thereafter; consequently, GNP figures expressed in 1948 market prices are somewhat atypical and the problems of converting them to factor cost are made more difficult.

1. The Bergson Figures for 1948. The 1948 GNP estimate in market prices as developed by Bergson is presented in Tables 4 and 5 -- the former table being a summary of the main income accounts and depreciation, the latter table being a breakdown of the Soviet 1948 GNP by use category. No breakdown by sector of origin for the year 1948 was made by Bergson and no such breakdown in market prices can be readily derived from his basic accounts.

The 1948 GNP estimate in adjusted prices (factor cost) as developed by Bergson is presented in Table 6. As indicated, the calculation of Soviet GNP at factor cost is made by use category, not by sector of origin. However, it is possible to derive a breakdown of this adjusted GNP by sector of origin from Bergson's estimate of Soviet net national income by economic sector for 1937. This derived estimate for 1948 is presented subsequently.

^{1/} Bergson and Heymann, Soviet National Income and Product, 1940-1948, New York, 1954. Bergson and his assistants have produced a number of other studies on these and previous years. See, for example, Bergson's Soviet National Income and Product in 1937, New York, 1953; and Oleg Hoeffding, Soviet National Income and Product in 1928, New York, 1954. These authors are now working on national income accounts for a year in the early 1950's and, at the same time, attempting to link the data on the various years for which GNP estimates have been made.

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Table 4. BERGSON-HEYMANN ESTIMATE OF 1948 SOVIET GROSS NATIONAL PRODUCT IN ESTABLISHED PRICES
(Income accounts)

	Billion 1948 Rubles	Percent
1. Current income of Households	500.5	61.7
1.1 Wages and salaries, non-farm	269.8	
1.2 Net farm income	132.0	
1.3 Income of artisans and other money income	34.8	
1.4 Pay and subsistence of armed forces	33.0	
1.5 Imputed net rent of owner-occupied dwellings	10.5	
1.6 Statistical discrepancy	20.4	
2. Consolidated Net Income of Government, Social and Economic Organizations	296.7	36.6
2.1 Turnover tax	247.5	
2.2 Other indirect taxes	47.8	
2.3 Custom duties; government receipts from reparations	16.5	
2.4 Charges to enterprises for special purposes	19.3	
2.5 Net income retained by economic organizations	18.6	
2.6 Allowance for subsidized losses	<u>-53.0</u>	
NET NATIONAL PRODUCT	797.2	98.3
Depreciation	<u>14.0</u>	<u>1.7</u>
GROSS NATIONAL PRODUCT	<u>811.2</u>	<u>100.0</u>

SOURCE: Tables 3, 4, 5, and 6, and Appendix Table 33 in Bergson-Heymann, op. cit.

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Table 5. BERGSON-HEYMANN ESTIMATE OF 1948 GROSS NATIONAL PRODUCT IN ESTABLISHED PRICES
(Bread own by Use Category)

	Billion 1948 Rubles	Percent
1. Consumption		
1.1 Household outlays on goods and services	451.8	
1.2 Military subsistence	19.0	
1.3 Communal services	85.1	
Total Consumption	555.9	68.5
2. Government Administration		
2.1 General administration	13.1	
2.2 Budgetary allotments to MVD-MGB	25.8	
Total Administration.....	38.9	4.8
3. Military Expenditures		
3.1 Budgetary appropriations for defense	66.3	
3.2 Other military outlays	---	
Total Military Outlays.....	66.3	8.2
4. Gross Investment		
4.1 Investments in fixed capital	66.2	
4.2 Investments in "own" working capital	17.1	
4.3 Extra-limit investments	12.0	
4.4 Collective farm investments	12.0	
4.5 Capital repairs	14.0	
4.6 Other investments	28.8	
Total Gross Investment	150.1	18.5
GROSS NATIONAL PRODUCT	811.2	100.0

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SOURCE: Tables 3, 4, 5, 6 and Appendix Table 33 in the Bergson-Heymann, op. cit.

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Table 6. BERGSON-HEYMANN ESTIMATE OF 1948 GROSS NATIONAL PRODUCT AT ADJUSTED FACTOR COST
(In billion rubles)

(Breakdown by Use Category)					
	GNP Estab. Prices	Adjustments		GNP Adjusted Prices	Percent
		Turnover Tax	Subsidies		
Multiple Prices					
1. Consumption					
1.1 Civilian households	451.8	191.1	13.5	265.9	
1.2 Military subsistence	19.0	8.0	0.8	13.0	
1.3 Communal services	85.1	17.9	1.9	71.7	
Total Consumption	555.9	217.0	16.2	350.6	56.8
2. Government Administration					
2.1 General administration	13.1	1.1	0.1	12.3	
2.2 Non-military functions of MVD-MGB	25.8	2.2	0.2	24.1	
Total Administration.....	38.9	3.3	0.3	36.4	5.9
3. Military Outlays					
3.1 Outlays as budgeted	66.3	2.5	7.6	71.9	
3.2 Other military outlays	--	--	--	--	
3.2a Paramilitary MVD-MGB	--	--	--	--	
3.2b Research and education	--	--	--	--	
3.2c Military installations	--	--	--	--	
3.2d Special weapons	--	--	--	--	
Total Military.....	66.3	2.5	7.6	71.9	11.7
4. Gross Investment					
4.1 Fixed capital	66.2	4.9	14.9	77.3	
4.2 "Own" working capital	17.1	--	--	17.1	
4.3 Extra-limit investments	12.0	0.9	2.6	13.9	
4.4 Collective farms investment	12.0	0.3	2.0	13.5	
4.5 Capital repairs	14.0	1.1	3.2	16.4	
4.6 Other	28.8	17.2	6.2	19.6	
Total Investment.....	150.1	24.7	28.9	157.8	
TOTAL GNP	811.2	247.5	53.0	616.7	100.0

SOURCE: Tables 3, 4, 5, 6, and Appendix Table 33 in the Bergson-Heymann, op. cit.

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The 1948 GNP figures developed by Estimate A differ from Bergson's in the following respects:

a. Total GNP: The total national product in market prices (viz. 811.2 billion rubles) is unchanged, but the total GNP at factor cost is higher. This difference is caused by the inclusion of differential land rent in Estimate A which, in effect, is equivalent to eliminating only part of the turnover tax.

b. Income Accounts: Estimate A uses a higher depreciation figure and, as a consequence, reduces the net income retained by economic organization. In addition, while the total for the household account is unchanged, certain modifications are made in the figures of the sub-items. The statistical discrepancy is eliminated and net farm income increased correspondingly; non-farm wages and salaries are also increased slightly. These changes are made because of a different treatment of land rent. Pay and subsistence of the armed forces are increased by the estimated amount of pay and subsistence of the military police.

c. Breakdown by use. Estimate A attempts to account for hidden defense expenditures, changes some investment sub-categories in the light of data not used by Bergson, and adds to the cost of government administration some expenditures of Party and trade unions insofar as they perform administrative functions of the government. These changes lead to a somewhat different breakdown of the GNP by end-use, though they do not as such change the GNP total in market prices. However, as noted above, the total GNP in adjusted prices (factor cost) is higher than Bergson's corresponding figure and the end-use breakdown of the GNP at factor cost is therefore affected by both these changes and the different treatment of land rent.

d. Breakdown by sector of origin: Estimate A develops a breakdown by origin of the 1948 GNP at factor cost. This breakdown is shown for both the GNP total at factor cost computed by Bergson and the somewhat higher GNP total that results when differential land rent is included as a factor cost.

2. The 1948 income accounts as modified by Estimate A. The income accounts used in Estimate A are shown in Table 7. The same basic data used by Bergson underlie the figures in this table, but different estimates of certain sub-items have been made.

a. Depreciation charges. For 1937 Bergson computed a depreciation of about 2 percent of the GNP in established rubles and 2.7 percent in adjusted prices. The corresponding US figure for 1937 was 7.6 percent. Measured against the national product, the Soviet stock of fixed capital is smaller than that of the US, and so Bergson supposes "that the correct

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Table 7. INCOME ACCOUNTS OF 1948 SOVIET GNP, IN ESTABLISHED PRICES: ESTIMATE A

	Billion 1948 Rubles	Percent
1. Current Incomes of Households	500.5	61.7
1.1 Wages and salaries, non-farm	264.8	
1.2 Net farm income	152.4	
1.3 Income of artisans and other money income	34.8	
1.4 Pay and subsistence of armed forces and military police	38.0	
1.5 Imputed net rent of owner-occupied dwellings	10.5	
1.6 Statistical discrepancy	--	
2. Consolidated Net Income of Government, Social and Economic Organizations.....	286.2	35.3
2.1 Turnover tax, including non-household share of land rent	247.5	
2.2 Other direct taxes	47.8	
2.3 Custom duties; government receipts from reparations	16.5	
2.4 Charges to enterprises for special purposes	19.3	
2.5 Net income retained by economic organizations	8.1	
2.6 Allowance for subsidized losses	-53.0	
NET NATIONAL PRODUCT	786.2	97.0
3. Depreciation	24.5	3.0
GROSS NATIONAL PRODUCT	811.2	100.0

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figure for the USSR would be double the present one or 5 percent of the gross national product in adjusted rubles." ^{1/} However, he continued to use for 1948 only 2 percent of the estimated stock of fixed capital (which is equivalent to about 2.3 percent of his estimated GNP).

A rate of 5 percent of the GNP in adjusted rubles corresponds to 3.5 percent depreciation on a fixed capital estimated at 325 billion 1937 rubles. The same percentage, if applied to the estimated 1948 fixed capital stock of 700 billion rubles (1948 prices), yields a depreciation charge of 24.5 billion rubles. This increased charge, which Bergson suggests ^{2/} without using it in his master table, is incorporated in Estimate A.

This revision does not alter the GNP total. It does not affect the total take of enterprises and government on account of depreciation, profits, and taxes; it only changes the distribution of these entries between depreciation, on the one side, and profits and taxes on the other. As a result the 10.5 billion added to depreciation is simply subtracted from net income retained by economic organizations. The revision of the depreciation charge does affect in a small way investment and military expenditures expressed in adjusted prices. However, this change is so small that it may be neglected.

b. Turnover Tax. Item 2.1 in Table 7 is quantitatively identical with item 2.1 in Table 4; however, there is a conceptual difference which ultimately affects the GNP calculation at factor cost. This item in Table 7 includes the government's share of estimated land rent. The total land rent is calculated at approximately 71 billion rubles ^{3/}, of which half is assumed to be received by the government and the remainder retained by the peasants.

c. Net Farm Income. In developing his figures on net farm income, Bergson recognized that some or all of the peasants' share of land rent was included in his evaluations of their incomes. At the same time, he observed that "to some limited extent, the turnover tax on agricultural produce is to be regarded not as a sales tax but as the economic counterpart

^{1/} Soviet National Income and Product in 1937, p. 81.

^{2/} Soviet National Income and Product 1940-48, p. 77.

^{3/} This estimate is derived from the computed share of agriculture in the GNP, which in turn is calculated as part of the estimated breakdown by sector of origin. See below, pp. 30-33, for further discussion.

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of land rent." 1/ He did not, however, specify how much of his estimated net farm income represented the peasant share of land rent and he made no explicit allowance for the government's share of the land rent in converting his GNP estimate for established prices to factor cost.

Inasmuch as Estimate A assumes that 35.6 billion rubles of the total land rent is retained by the peasants, certain modifications have to be made in the household account. The hypothesis adopted is that in the Bergson calculation only part of the peasants' share of the land rent was included in his estimate of net farm income and that, if an explicit allowance for land rent had been made, the statistical discrepancy in the household account would have been eliminated. Accordingly, item 1.6 is eliminated as a statistical discrepancy and the amount (20.4 billion rubles) is added to net farm income. The remaining 15.2 billion rubles of the peasants' share of the land rent is assumed to have been included in the original Bergson estimate of 132.0 billion rubles for net farm income.

d. Pay and Subsistence of Military Police. In developing a breakdown by end-use, Estimate A includes under military outlays the pay and subsistence of MVD-MGB personnel. Item 1.4 is accordingly increased by 5.0 billion rubles 2/ and the corresponding amount deducted from item 1.1. The wages and salaries of MVD-MGB personnel were, of course, included in the latter item in the Bergson calculation; their subsistence was not. Strictly speaking, the small amount estimated for MVD-MGB subsistence should either be added to the household account or taken out of the statistical discrepancy, but in view of the fact that the figure for item 1.1 is itself an estimate, the entire allowance for MVD-MGB pay and subsistence is simply taken from non-farm wages and salaries.

3. The 1948 Breakdown by Use in Estimate A

a. Market prices. The breakdown by end-use of the 1948 Soviet GNP in market prices is shown in Table 8. The same general procedure used by Bergson was followed in developing this breakdown.

(1) Consumption. The consumption figures differ from those shown in Table 5 for the following reasons: (1) the estimated amount of subsistence for the military police (2.9 billion rubles) is excluded in item 1.1 and is included in item 1.2 and (2) communal services is reduced by 6 billion rubles, 4 billion of which were

1/ Soviet National Income and Product in 1937, pp. 61-62. See also Soviet National Income and Product 1940-46, p. 56.

2/ See below pp. 28-29, for derivation of this figure.

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Table 8. BREAKDOWN BY USE OF 1948 SOVIET GNP, IN ESTABLISHED PRICES: ESTIMATE A

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	Billions Roubles	Percent
1. Consumption		
1.1 Civilian households	448.9	
1.2 Military subsistence	21.9	
1.3 Communal services	79.1	
Total Consumption	549.9	68.0
2. Government Administration		
2.1 General administration	15.1	
2.2 MVD-MGB allocation	17.5	
Total Administration	32.6	3.8
3. Military Outlays		
3.1 Outlays as budgeted	66.3	
3.2 Other military outlays	19.3	
3.2a Paramilitary outlays	8.3	
3.2b Military research and education	4.0	
3.2c Military installations	2.0	
3.2d Special weapons	5.0	
Total Military Outlays	85.6	10.6
4. Gross Investment		
4.1 Budgetary expenditures on fixed capital	59.2	
4.2 Budgetary allocations for working capital	17.1	
4.3 Extra-limit investments	--	
4.4 Collective farm investments	8.8	
4.5 Capital repairs	20.2	
4.6 Other	37.8	
Total Investment	143.1	17.6
GROSS NATIONAL PRODUCT	811.2	100.0

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transferred to "Military Expenditures" to account for military research and education and the remaining 2 billion were transferred to "Government Administration" to account for Party and trade union activities of a general administration nature. The general result of these changes reduces aggregate consumption by about 1 percent.

(2) Government Administration. Bergson's item "Government Administration" consists of expenditures for the upkeep of all organs of government as covered in the Soviet budget plus an estimate of expenditures for the MVD-MGB apparatus. These police expenditures are hidden in the unexplained residue of the Soviet budget. The item "administration" does not include the administration of the armed forces; expenditures for this purpose are included in the category "Military Outlays."

In Estimate A this concept of "Government Administration" was modified in two ways. First, the estimated cost of the military police was transferred to the category "Military Outlays" (item 3.2a) ^{1/}; hence the estimated expenditures on the MVD-MGB retained in the category "Government Administration" represent the non-military portion of Bergson's 25.8 billion rubles. Second, an allowance was made for some of the administrative expenditures of the Communist Party and the trade unions; in Bergson's calculation these outlays were included in the category "consumption."

The role of the government varies, of course, from country to country; the differences are particularly great among countries with different social systems. What is governmental function in one country may be managed by business, welfare associations, political parties, churches, etc. in other countries. It is impossible to make the international statistics of administrative expenditures strictly comparative. It is, however, felt that "expenditures on government administration" as mirrored in the Soviet budget account understate Soviet administrative cost of Party and trade unions insofar as they perform clearly governmental functions. The Communist Party of the USSR directs and instructs the government with respect to policies in general and in detail and supervises all branches and levels of the government; it also frequently seizes the functions of the executive branch. The trade unions, in turn, administer the social insurance system and act as agents of the government in distributing government funds for old-age pensions, disability, payments, and so on.

For the purpose of this paper a flat 2 billion rubles were added to administrative expenditures. This sum was derived by adding the salaries of 100,000 full-time Party employees in raion and higher level

^{1/} See below, p. 29-30 for further discussion of military outlays.

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organizations at an annual salary of 12,000 rubles 1/ plus a 20 percent supplement for office supplies, rent, etc., and some 500,000 rubles for trade union administration. 2/

(3) Military Outlays. Bergson's category "Defense" contains only military expenditures as recorded in the budget of the USSR. Estimate A adds the probable amounts of appropriations which, though military in purpose, are included in the Soviet budget categories "Financing the National Economy," "Social and Cultural Services," and in the unexplained residual item. This transfer reduces investment, consumption, and administration outlays without affecting the GNP total.

(a) MVD-MGB Allocations. Part of the police troops are for all practical purposes a military force. In 1948 they numbered about half a million men, i.e., one eighth of the armed forces. Being elite troops, their living conditions are probably somewhat superior to those of the soldiers; their armament is, of course, less complex and costly. Since in 1948 munitions procurement was relatively low, it was considered reasonable to allow one eighth of the military budget for the upkeep of the military police, i.e., 8.3 billion rubles in established prices. This amount was transferred from Government Administration and, in particular, the MVD-MGB budget. The MVD-MGB budget was thus reduced from 25.8 to 17.5 billion net of paramilitary expenditures. It was furthermore assumed that 60 percent of the 8.3 billion, i.e., 5 billion, were devoted to pay and subsistence, thus affording the police troops living conditions 20 percent above those of the average soldier. The remaining 40 percent (3.3 billion) represent outlays for weapons and other supplies for these police troops. 3/

1/ There exist some 5,600 republic, krai, oblast, okrug, city, and raion Party committees and it was conservatively estimated that the number of full-time Party workers in each of the committees has ranged from 18 to 25.

2/ The latest figure on administrative expenditures -- 510 million rubles -- concerns the 1946 trade union budget quoted in Professionalnye Soyuzy (Trade Unions), January 1947. Between 1946 and 1948 the trade union membership has grown by about 10 percent to 28,500,000 and administrative expenditures should have increased somewhat. Price changes between 1946 and 1948 may not have significantly affected the administrative expenditures of the unions.

3/ If the 5 billion rubles were divided between pay and subsistence in the relation Bergson used for the armed forces (14:19), the pay would have amounted to 2.1 billion rubles, the subsistence to 2.9 billion.

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(b) Military Research and Education. The Soviet budget item "Expenditures for Social and Cultural Measures" includes certain amounts for the training of officers' corps and for scientific research of a military nature. It was estimated that 1 billion rubles were spent for the first purpose, 3 billion for the second.

(c) Military Installations. Military installations financed from funds outside the armed forces budget are known to have played a great role shortly before the Second World War. According to the Soviet economic plan for 1941, 20 percent of investment in fixed capital was scheduled to be invested in armament plants and an additional 8 percent in military installations out of the funds of the Commissariats for Munitions Industry, Armament Industry, Aviation Industry, Shipbuilding Industry, etc. (10 and 4 billion rubles, respectively). The amounts spent for similar purposes after the war were, of course, smaller. In Estimate A, investments in armament plants from funds outside the armed forces budget are kept in the category "Gross Investment," but an allowance of 2 billion rubles was transferred from fixed capital investments to the category "Military Outlays" for military facilities.

(d) Special Weapons. Soviet development of special weapons, including nuclear weapons, is financed at least in part by funds outside the explicit defense appropriation in the budget. The amount spent for such purposes in 1948 cannot be estimated with any degree of accuracy; however, not to allow explicitly for such expenditures would certainly underestimate total Soviet direct military expenditures. The figure used in Estimate A is admittedly only a rough guess, but is believed to be a conservative allowance that is at least correct in general order of magnitude.

(e) Total Military Outlays. The above-mentioned four items, together with budgeted defense expenditures, constitute total military outlays in Estimate A. Outlays for strategic stockpiling have been kept in the category "Gross Investment" and no estimate is made of the money value of military support received from or given to other countries.

(4) Gross Investment. Budgetary expenditures on fixed capital (item 4.1) were reduced 7 billion rubles as a result of transferring to the category "Military Outlays" the estimated amounts spent on military installations (2 billion rubles) and special weapons development (5 billion rubles). Aside from this transfer, the figures for gross investment in Estimate A differ from Bergson's in the following respects:

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(a) Collective farm investments are believed to have been overstated by Kaplan 1/, who subsequently revised his estimate. An independent estimate of 8.8 billion rubles (including 1.3 billion credits) was used instead. 2/

(b) For similar reasons, Bergson's estimate of capital repairs (14 billion rubles) was abandoned in favor of a somewhat higher figure (20.2 billion rubles).

(c) Bergson had a separate entry for extra-limit investments. Now it appears as though they were included in the budgeted fixed capital figure. Without deciding whether or not this is true, it was considered preferable to eliminate the category entirely.

(d) Since total investments are calculated as a residual, "other investments" increase correspondingly.

b. Factor Cost. In order to convert the 1948 GNP figures from market prices to factor cost, it is necessary to make three adjustments for each constituent item. Firstly, part or all of the turnover tax must be subtracted; secondly, subsidies must be added; and thirdly, adjustments between various sub-items must be made to offset the distortions caused by multiple prices. All of these adjustments are made in accordance with Bergson's procedures, 3/ but, as previously mentioned, Estimate A considers differential land rent as a factor cost. Table 9 shows separately the three adjustments excluding the government's share of land rent and there-with the modified breakdown by use of the Bergson GNP total at factor cost (viz. 616.7 billion rubles). Table 9 then shows how the latter breakdown is further changed by the inclusion of the government's share of land rent as a factor cost.

1/ Kaplan, Capital Investments in the Soviet Union, 1924-51, November 1951. The data in established prices in this study were used by Bergson in his GNP analysis.

2/ This independent estimate is equivalent to that used in Estimate B.

3/ For details of the adjustments, item by item, see Bergson-Heymann op. cit., Appendix D. It should be noted that in making these adjustments in Estimate A, the figures in market prices for each use category have already been modified as indicated in Table 8 above.

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Table 9. BREAKDOWN BY USE OF 1948 SOVIET GNP, AT FACTOR COST: ESTIMATE A
(Billions of 1948 rubles)

	GNP Estab. Prices	Adjustments		GNP Adjusted Prices (exc. Govt. Land Rent)	Govt. Share of Land Rent	GNP Adjusted Prices (incl. Govt. Land Rent)	Percent
		Turnover Tax	Subsidies				
Consumption							
1.1 Civilian households	448.9	189.9	13.4	-8.5	33.9	297.8	
1.2 Military subsistence	21.9	9.2	0.9	41.2	1.7	16.7	
1.3 Communal services	79.1	16.9	1.8	42.5	--	66.5	58.4
TOTAL CONSUMPTION	549.9	216.0	16.1	44.6	35.6	381.0	
Government Administration							
2.1 General administration	15.1	1.3	0.1	40.2	--	14.1	
2.2 MVD-MGB (excl. item 3.2a)	17.5	1.9	--	40.3	--	15.9	
TOTAL ADMINISTRATION	32.6	3.2	0.1	40.5	--	30.0	4.6
Military Outlays							
3.1 Outlays as budgeted	66.3	2.5	7.6	40.5	--	71.9	
3.2 Other military outlays	19.3	1.6	1.9	40.2	--	19.8	
3.2a Paramilitary MVD-MGB	8.3	0.3	0.2	--	--	8.2	
3.2b Research and education	4.0	0.8	0.1	40.1	--	3.4	
3.2c Military installations	2.0	0.1	0.5	--	--	2.4	
3.2d Special weapons	5.0	0.4	1.1	40.1	--	5.8	
TOTAL MILITARY	85.6	4.1	9.5	40.7	--	91.7	14.1
Gross Investment							
4.1 Budgeted fixed capital	59.2	4.4	13.3	41.0	--	69.1	
4.2 Budgeted working capital	17.1	--	--	--	--	17.1	
4.3 Extra-limit investments	--	--	--	--	--	--	
4.4 Collective farms "	8.8	0.4	1.5	40.1	--	10.0	
4.5 Capital repairs	20.2	1.6	4.6	40.4	--	23.6	
4.6 Other	37.8	17.8	7.9	41.9	--	29.8	
TOTAL INVESTMENT	143.1	24.2	27.3	43.4	--	149.6	22.9
TOTAL GNP	811.2	247.5	53.0	--	35.6	652.3	100.0

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The land rent under discussion is rent purely in the economic sense; contract rent does not exist in the USSR. 1/ This economic land rent is partly retained by the tillers of the soil and partly appropriated by the government. Collective farms (and the as yet uncollectivized peasants, of whom there were several million in 1948) earn the rent insofar as they consume self-produced foodstuffs and sell other produce on peasant markets at prices above those of the government stores. 2/ State farm workers and other rural or urban dwellers with kitchen plots also acquire some land rent. Inevitably farmers with superior land are better off than their less favored colleagues, at least before direct taxes. The government appropriates the rest of the land rent insofar as, in a very crude way, it takes account of fertility and location of the land in fixing the prices it pays the agricultural producers for their obligatory and voluntary deliveries. The state sells the produce at uniform prices and thus its revenue contains its share of the rent of superior land.

A cursory examination of the land rent problem shows that the amounts involved are by no means negligible. In the US, land rent (contracted as well as imputed rent) represents about one-third of the net agricultural output. In backward agricultural countries the land rent may constitute as much as half of the value added in agriculture, or even more where land-hungry peasants are willing to work for a near-starvation income. It is believed that in the USSR, with its low productivity of farm labor and fairly high contribution of capital to net agricultural output, the land rent would amount to roughly 40 percent of that output. This percentage is used in Estimate A to calculate the total land rent. 3/

Since about half of Soviet agricultural output is either consumed on the farms or sold on peasant markets, while the other half is delivered to the government, it was assumed that half of the land rent accrues to the peasants and the remainder is hidden in government revenues, notably in the turnover tax. As indicated above, an undetermined amount of the peasants' share of the land rent is already included in the Bergson

1/ See *Kolkhozhnoye Pravo*, ed. by N. D. Kasantrev and A. A. Ruskol, Moscow, 1950, p. 162. See also the discussion of differential rent in *Politicheskaya Ekonomiya - Uchebnik*, Moscow 1954.

2/ Thus the peasants' income also contains some trace of monopoly rent and interest on investments.

3/ Net agricultural output in 1948 is estimated to be 178.1 billion rubles (see p. 36, below); hence, the land rent amounts to 71.2 billion rubles.

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estimate of net farm income. If that amount were known, a direct adjustment of the figure for net farm income could have been made -- namely, an increase by the difference between the calculated peasants' share of land rent (35.6 billion rubles) and the amount implicitly assumed by Bergson. Inasmuch as this procedure was not feasible, it was assumed that that difference would not exceed the 20.4 billion ruble statistical discrepancy in the original Bergson estimate (see Table 4, above). Thus, while much of the peasants' share of the land rent is assumed to be included in Bergson's GNP estimate at factor cost, the government's share was in effect excluded by the elimination of the entire turnover tax. The government's share of the land rent therefore has been reinstated in the present calculation.

The inclusion of this land rent increases the total GNP at factor cost from 616.7 to 652.3 billion rubles, or by 5.8 percent. Insofar as the land rent affects consumption, it was proportionately distributed between civilian households and military subsistence (including the subsistence of both the armed forces and the military police). Accordingly, the breakdown of the 652.3 billion figure shown in Table 9 serves as the basis for calculating the size and composition of the Soviet GNP at factor cost for the period 1948-54.

4. The 1948 Breakdown by Sector of Origin in Estimate A. The breakdown of the 1948 GNP by sector of origin in Estimate A is calculated indirectly. No attempt was made to compute each sector's contribution to the GNP from the 1948 income and outlay data assembled by Bergson. Instead, his breakdown of the net national product (at factor cost) for 1937 was used as a base ^{1/} and moved forward to 1940 and 1948 by means of independent sector indices. The percentage breakdowns of the GNP in the years 1937, 1940, and 1948, together with the resulting indices for the four main components, are shown in Table 10.

a. Sector Developments, 1937-48

1. Agriculture. Between 1937 and 1940 the USSR acquired enough territory to increase its agricultural output under normal weather conditions by 16 percent. Officially the increase was given as 15.7 percent, but this figure is exaggerated if only because in 1939 the system of estimating biological rather than barn yields was extended to industrial crops. ^{2/} For this reason, and also to take account of the fact that the weather was exceptionally favorable in 1937 and below average in 1940, the actual increase in output by 1940 is estimated at about

^{1/} Bergson, Soviet National Income and Product in 1937, New York, 1953, p. 98.

^{2/} See N. Jasny, The Socialized Agriculture of the USSR, Stanford, California, 1949, p. 674.

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Table 10. ESTIMATED INDICES OF SOVIET GNP BY SECTOR OF ORIGIN:
1937, 1940, 1948 a/

	<u>1937 b/</u>	<u>1940 c/</u>	<u>1948 c/</u>
<u>1937=100</u>			
Agriculture	31.2	34.9	26.9
Industry and construction	36.5	41.1	45.6
Transportation and communications	8.1	9.4	10.1
Trade, finance, services, etc.	24.2	34.8	33.8
TOTAL GNP	<u>100.0</u>	<u>120.2</u>	<u>116.4</u>
<u>1940=100</u>			
Agriculture	25.9	29.0	22.3
Industry and construction	30.4	34.2	38.0
Transportation and communications	6.7	7.8	8.4
Trade, finance, services, etc.	20.7	29.0	28.2
TOTAL GNP	<u>83.7</u>	<u>100.0</u>	<u>96.9</u>
<u>1948=100</u>			
Agriculture	27.1	30.4	23.1
Industry and construction	31.6	35.6	39.2
Transportation and communications	7.0	8.1	8.7
Trade, finance, services, etc.	21.0	30.2	29.0
TOTAL GNP	<u>86.7</u>	<u>104.3</u>	<u>100.0</u>

a/ Figures for 1937 refer to USSR's prewar boundaries; figures for 1940 and 1948 refer to postwar boundaries.

b/ For the year 1937 Bergson gives the following breakdown in percent of the net national product in adjusted prices:

Agriculture	29.9
Industry and construction	34.9
Transportation and communications	7.7
Trade, including restaurants	4.8
Finance	0.9
Services, including government	17.4
Other, including statistical discrepancy	4.5
	<u>100.0</u>

Bergson's estimate of Soviet gross national product for that year was 2.7 percent greater than the estimated net national product, but was not broken down by sector of origin. This difference was disregarded on the assumption that depreciation would be distributed among the main components in approximately the same proportion as their respective shares of the total GNP. The Bergson breakdown included 4.0 percent for statistical discrepancy and 0.5 percent for a miscellaneous category called "other;" these 4.5 percent of the total GNP were distributed proportionately among the four components shown in the table.

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12 percent. Estimated output of key agricultural commodities indicate, that 1948 production was 20-25 percent below that of 1940. The 1948 index for this component of the GNP was therefore calculated at 77 percent of the 1940 figure.

ii. Industry and Construction. Industry and construction expanded rather slowly between 1937 and 1940 and the annexations did not add appreciably to Soviet industrial capacity. Hodgman's index of industrial production ^{1/} rose during those three years at a compound rate of 4.7 percent per annum; Shimkin's index of mineral consumption ^{2/} by 3.7 percent per annum. Construction is believed to have increased more slowly than industrial production. In the light of these figures an increase of 4 percent per annum was used for industry and construction combined.

By 1948, both Hodgman's industrial index and the index of total freight turnover were 8 percent above 1940 while Shimkin's mineral consumption index shows an increase of 13.6 percent. The low level of agricultural output in 1948 tended to retard the increase in freight turnover and thereby to make this index a poor measure of industrial progress between 1940 and 1948. This consideration, as well as Shimkin's index, cast some doubt on Hodgman's 8 percent figure. ^{3/} It was therefore decided to use a compromise figure of 11 percent increase in industrial output and construction between 1940 and 1948.

iii. Transportation and Communications. Total freight turnover increased by about 5 percent per annum between 1937 and 1940 and this percentage was used to move the index for transportation-communications from 1937 to 1940. The 8 percent overall increase of the freight turnover index mentioned previously was applied to the period 1940-48,

^{1/} Hodgman, Soviet Industrial Production 1928-1951, Cambridge, Mass., 1954. A preliminary version appeared as "Industrial Production" in Soviet Economic Growth, ed. A. Bergson, Evanston, Ill., 1953, p. 236.

^{2/} Shimkin and Grossman, Mineral Consumption and Economic Development in the United States and Soviet Union, Russian Research Center, Harvard University, Cambridge, Mass., April 1952, p. 25.

^{3/} He himself speaks frankly of the deficiencies in his calculations for these years. See op. cit. pp. 85-88.

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iv. Services. The contribution to the national product of services, trade, finance, and all other components was determined by increasing the 1937 figure by the growth rates of the employed labor force in this sector. While it is reasonable to assume that output per man-day probably did not change significantly within this short period, the labor force figures themselves are very difficult to estimate. The Soviet armed forces are believed to have grown from about 1.5 million in 1937 to 3 million in 1940 ^{1/}; they numbered about 4 million in 1948. The number of workers and employees in the general government administration, other services, and trade seems to have increased from 9 to 10.9 million between 1937 and 1940 and to have declined to 10.8 million in 1948. For the third category of persons included in this computation, viz. handicraftsmen engaged in service trades, it was assumed that of all craftsmen (cooperative and individual) half were producing, the other half servicing, and that their number changed from 2.5 million in 1937 to 2.8 million in 1940 and 3.2 million in 1948. ^{2/}

b. Sector breakdown of GNP at factor cost. The derived percentages for 1948 shown in Table 10 cannot be applied to the total GNP in market prices, since the underlying 1937 figures were already adjusted to a factor cost basis. If the net output of the four main sectors moved as indicated in Table 10, then the ruble value of each sector's output in 1948 can be computed from the total GNP for the year as calculated by Bergson (viz. 616.7 billion rubles). The sector breakdown of the GNP at factor cost as defined in Estimate A, however, must include the government's share of the land rent.

Both breakdowns are shown in Table 11. The ruble figures for the components of the GNP without land rent are obtained by applying the previously derived 1948 percentages to the indicated total; the breakdown of the GNP including the land rent is obtained by adding the government share of that rent (viz. 35.6 billion rubles) to the net output of agriculture. The percentage distribution of the latter GNP is accordingly modified, even though the ruble figures for the other three sectors remain unchanged.

^{1/} See The Armed Forces of the USSR: Number of Personnel, 1919-1940.

^{2/} CONFIDENTIAL, working paper prepared by the Department of Commerce, Bureau of the Census.

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Table 11. BREAKDOWN BY SECTOR OF ORIGIN OF SOVIET 1948 GNP AT FACTOR COST

	GNP Without Land Rent		GNP With Land Rent Added	
	Billion Rubles	Percent	Billion Rubles	Percent
Agriculture	142.5 a/	23.1	178.1	27.3
Industry and construction	241.7	39.2	241.7	37.1
Transportation and communications	53.7	8.7	53.7	8.2
Trade, finance, services, etc.	178.8	29.0	178.8	27.4
TOTAL GNP	616.7	100.0	652.3	100.0

a/ While Bergson does not develop a breakdown by origin in his estimate of the 1948 GNP, it is possible to compute the approximate magnitude of the net agricultural output in that year from his income accounts. The net income of households allocatable to the agricultural sector is given as 132.0 billion rubles. This figure has to be increased by 20.4 billion rubles to allow for the peasants' share of the land rent, which is assumed to have been excluded by Bergson. Net income retained by collective farms is 7.8 billion rubles; indirect taxes allocated to agriculture amount to about 6.0 billion rubles; and charges for special funds are about 1.7 billion rubles. The sum of these figures is 168.0 billion. While this latter total, by definition, already includes subsidies received by agriculture, it does not reflect the adjustment made to offset distortions caused by multiple prices. The latter adjustment, in Bergson's calculation, consists of subtracting 27.0 billion rubles from the estimated sales on collective farm markets. Hence, the indicated net value of agriculture at factor cost, but excluding the government's share of land rent, is 141.0 billion rubles or 1 percent less than the figure as given in the table.

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B. Soviet GNP 1928-1948

1. Breakdown by Sector of Origin. Rough GNP figures for the years prior to the base year were developed by following the same general procedure that was used in calculating the 1948 sector breakdown. Given the latter figures as shown in Table 11, the ruble value of the total GNP in 1937 and 1940 can be calculated from the indexes presented in Table 10.

a. Estimates for 1937 and 1940. On this basis, the 1940 GNP that is conceptually comparable to the 1948 GNP, excluding the government's share of land rent (viz. 616.7 billion rubles), is 104.3 percent of the 1948 figure or 643.2 billion rubles. Similarly, the 1937 figure is 86.7 percent of the 1948 figure or 534.7 billion rubles.

These totals were broken down by sector of origin by using the appropriate percentages in Table 10. In order to take account of the government's share of land rent, the net value of agriculture so computed was increased by 25 percent - the same percentage that prevailed in 1948 (see Table 11). This assumes, of course, that the amount of the government's share of land rent in these prewar years was approximately the same proportion of the net agricultural output as in 1948. The increased value of agricultural output is then added to the calculated value of output of the other three sectors to arrive at a GNP total comparable to the 1948 figure of 652.3 billion rubles. The results of all these computations are summarized in Table 12.

b. Estimate for 1928. For the year 1928, the GNP total and its components was estimated by linking sector indices for the period 1928-37.

According to Jasny, ^{1/} Soviet agriculture increased its output (net as well as gross) by 15 percent, i.e. by 1.6 percent per annum, during this period. This percentage increase is used in the present calculation with the full realization that an accurate measurement of the value of Soviet agricultural production during the period of collectivization is virtually impossible.

The value of industrial production in 1928 is calculated from employment and productivity estimates. Factory employment in large-scale industries (excluding large-scale cooperatives, but including forestry and fisheries) increased from 3.1 million persons in 1928/29 to 8.8 million on January 1, 1936, i.e. by 183 percent in seven years. Employment in small-scale industry and in cooperatives (members as well as workers and employees) grew from 1.6 million to 2.2 million persons, i.e. by 38 percent. Hence the total industrial labor force

^{1/} Naum Jasny, The Socialized Agriculture of the USSR, p. 775.

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Table 12. SOVIET GNP (FACTOR COST) BY SECTOR OF ORIGIN, 1928, 1937, 1940, 1948

	1928	1937	1940	1948
A. In billions of 1948 rubles				
Agriculture	181.3	208.5	233.1	178.1
Industry and construction	62.5	195.5	220.1	241.7
Transportation and communications	12.3	43.4	50.2	53.7
Trade, finance, services, etc.	77.0	129.7	186.7	178.8
TOTAL GNP	333.1	576.4	689.8	652.3
B. In percent				
Agriculture	54.4	36.1	33.8	27.3
Industry and construction	18.8	33.8	31.9	37.1
Transportation and communications	3.7	7.5	7.3	8.2
Trade, finance, services, etc.	23.1	22.6	27.0	27.4
TOTAL GNP	100.0	100.0	100.0	100.0
C. Previous Indicated Year=100				
Agriculture	...	115.0	111.8	98.2
Industry and construction	...	312.6	112.6	109.8
Transportation and communications	...	352.8	115.7	107.0
Trade, finance, services, etc.	...	168.4	143.9	95.8
TOTAL GNP	...	173.0	119.7	94.6
D. 1948=100				
Agriculture	101.8	117.1	130.9	100.0
Industry and construction	25.9	80.9	91.1	100.0
Transportation and communications	22.9	80.8	93.5	100.0
Trade, finance, services, etc.	43.1	72.5	104.4	100.0
TOTAL GNP	51.1	80.3	105.7	100.0

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increased from 4.7 million to 11.0 million, or by 133 percent. Output per worker probably increased during this period primarily, if not exclusively, as a result of the greater increase in employment in large-scale industry. It is assumed that the latter's higher productivity is reflected in the average monthly income of workers in large-scale industry as compared to small-scale industry. On this basis, output per worker in large-scale industry would be about 38 percent greater than in small-scale industry. 1/ Assuming that this ratio did not change between 1928/29 and January 1936, industrial output during these seven years would have increased by 144 percent, or by 13.5 percent per annum. 2/ The latter figure is used for the period 1928-37.

Figures for the transportation-communication sector were calculated on the basis of freight turnover of all carriers, which rose by 15 percent per annum during the 1928-37 period. The service sector was moved on the basis of the number of workers and employees in selected service groups. In the absence of better data, labor force figures on educational and medical personnel were considered representative of the contribution of the service sector as a whole. The increase per annum (about 6 percent) is at best an approximation. However, a rate higher than in postwar years is likely since during the two first Five-Year Plans industrialization and urbanization required a proportionately larger government apparatus and therewith more rapid increases in administrative personnel as well as teachers, doctors, and the armed forces.

1/ In 1936 the average monthly income in large-scale industry was 217.50 rubles as compared to 157.30 rubles in small-scale and cooperative industry.

2/ The product of employment and output per worker indices is as follows:

	Employment			Productivity		Output		
	Large	Small	Total	Large	Small	Large	Small	Total
1928/29	66	34	100	138	100	91	34	125
January 1936	187	47	234	138	100	258	47	305

Converting the above output indices to a 1928/29 base, the January 1936 index numbers are as follows: Large scale - 283; small-scale - 138; total industry - 244.

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2. Breakdown by End-Use. Table 13 shows the estimated breakdown by end-use of the Soviet GNP in 1937 and 1940. No similar breakdown was developed for 1928. ^{1/} The rapid change of the price structure between 1928 and 1937 makes it inappropriate to use physical output data as yardsticks for measuring the relative development of investment, consumption, and the other use categories. It is well-known that in physical terms the production of basic raw materials and machinery increased greatly between 1928 and 1937, but at diminishing factor cost. By computing the value of the output during the period 1928-37 at prices of an early or late year a range of growth figures can be developed, but such a study was not attempted in Estimate A.

For the years 1937 and 1940, the percentage breakdown developed by Bergson were initially applied to GNP totals unadjusted for land rent. The sum allotted for land rent was then added to consumption. Moreover, in line with previously explained modifications of the accounts as computed by Bergson, some items were shifted among the use categories without affecting the GNP total.

a. Administration. These expenditures accounted for 3.1 percent of the Bergson adjusted GNP in 1937 and to 3.6 percent in 1940. In absolute figures, they total 16.6 billion adjusted 1948 rubles for 1937 and 23.2 billion for 1940. These latter amounts were then increased by an allowance for the quasi-governmental functions of Party and trade unions. For the year 1948 1.44 billion was added on account of the Party and 0.56 billion on account of the unions. ^{2/} Membership in the Party and trade unions was used as a yardstick to calculate

^{1/} The Hoeffding study for 1928 (viz. Soviet National Income and Product in 1928, New York, 1954) arrives at a share of gross investment in GNP of 23.2 percent (Table 6, p. 46) or, in a modified version, of 20.4 percent (p. 72). This ratio is about the same as Bergson's ratio for 1937 (22.9 percent). The 1928 share of consumption (personal and communal) in the GNP is 71.5 percent or, in the revised version 71.5 percent as compared to Bergson's 66.3 percent in 1937. It is quite likely that in current prices investment in 1928 were quite heavy, since it was the year when the First Five-Year Plan began. However, producers' goods prices in that year were high, so that, expressed in prices of 1937 or later years, the investment effort of that year would shrink and consumption would correspondingly increase. If this change in the price structure were neglected, the Hoeffding-Bergson statistics would imply that between 1928 and 1937 consumption increased almost as much as investment. This would be contrary to what is known of the sluggish development of consumption as well as of the rapid expansion of producers' goods output.

^{2/} See above, pp. 27-28.

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Table 13. SOVIET GNP (FACTOR COST) BY END-USE, 1928, 1937, 1940, 1948

	1928	1937	1940	1948
A. In billions of adjusted 1948 rubles				
Administration	n.a.	13.3	17.8	30.0
Military outlay	n.a.	47.9	115.7	91.7
Gross investment	n.a.	120.6	98.6	149.6
Consumption	n.a.	394.6	457.7	381.0
TOTAL GNP	333.1	576.4	689.8	652.3
B. In Percent				
Administration	n.a.	2.3	2.6	4.6
Military outlay	n.a.	8.3	16.8	14.1
Gross investment	n.a.	20.9	14.3	22.9
Consumption	n.a.	68.5	66.3	58.4
TOTAL GNP	100.0	100.0	100.0	100.0
C. Previous Indicated Year=100				
Administration	...	...	133.8	168.5
Military outlay	...	...	241.5	79.2
Gross investment	...	...	81.8	151.7
Consumption	...	...	116.0	83.2
TOTAL GNP	...	173.0	119.7	94.6
D. 1948=100				
Administration	n.a.	44.3	59.3	100.0
Military outlay	n.a.	52.3	126.2	100.0
Gross investment	n.a.	80.6	65.9	100.0
Consumption	n.a.	103.5	120.1	100.0
TOTAL GNP	51.1	88.3	105.7	100.0

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n.a. - Not available.

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similar outlay figures for 1937 and 1940. 1/ On the assumption that the value of the quasi-governmental functions of the Party and unions paralleled membership, the additional administration expenditures in 1937 amount to 0.8 billion (0.42 billion for Party, 0.38 billion for unions) and in 1940 to 1.21 billion (0.72 billion for Party, 0.49 billion for unions).

Military police expenditures were transferred from the administration category to defense. For the base year 1948, the amount similarly transferred was estimated at 8.3 billion adjusted 1948 rubles. 2/ The 1937 and 1940 figures were estimated at about 50 and 80 percent respectively of this sum or 4.1 and 6.6 billion. The result is 16.6 plus 0.8 minus 4.1 = 13.3 billion adjusted 1948 rubles for 1937 and 23.2 plus 1.2 minus 6.6 = 17.8 billion for 1940.

b. Military Outlay. Bergson's percentages for defense (viz. 7.7 percent of adjusted GNP for 1937 and 15.6 for 1940) are used to calculate explicit military expenditures in adjusted 1948 rubles for these prewar years, namely, 41.5 billion in 1937 and 100.1 billion in 1940. To these amounts were added the aforementioned outlays for the military police, 0.5 and 1 billion for military education and research, and 2 and 8 billion respectively for military installations. 3/ These additions increase the military outlay to 48.4 billion adjusted 1948 rubles in 1937 and 115.7 billion in 1940.

c. Investments. The Bergson percentages are 22.9 and 16.6 percent of GNP for 1937 and 1940, respectively or 122.6 and 106.6 billion adjusted 1948 rubles. These amounts were reduced by transferring 2 and 8 billion rubles from the investment to the defense item on account of military installations. Thus the investment figures are 120.6 and 98.6 billion for 1937 and 1940.

1/ Party membership was about 1.98 million in 1937, 3.4 million in 1940, and 6.3 million in 1948. There were about 19.6 million union members in 1937, 25 million in 1940, and 28.5 million in 1948.

2/ See above, Table 8.

3/ The latter figure is based on the 4 billion current rubles which, in the 1941 plan, were appropriated outside the explicit military budget for military facilities; the same amount, in real terms, was assumed for the year 1940, but the figure in current rubles was doubled on account of the depreciation of the ruble between 1940 and 1948.

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d. Consumption. The figures shown in Table 13 are residuals obtained by deducting administrative, military, and investment outlays from the GNP totals including land rent. While aggregate consumption, so derived, was 16 percent higher in 1940 than in 1937, on a per capita basis consumption in 1940 was slightly lower than in 1937 -- in part because of the additional population acquired through annexation.

C. Soviet GNP, 1948-53

1. Development by Economic Sector. The estimate of Soviet GNP for the period 1948-53 begins with the breakdown by origin of the 1948 Soviet GNP at adjusted factor cost and proceeds by estimating how these sector contributions to the national product developed in the period under review. Sector indices are applied to the breakdown of the 1948 GNP by origin, ruble figures derived for each sector and for the GNP as a whole for the years after 1948, and finally the total GNP is then distributed by end-use. Thus the first step is to determine the increase of output in agriculture, industry, etc. for the years under review. The rates of growth obtained are presented in sections C and D of Table 14.

a. Agriculture. The agricultural output index is based on the estimated production of typical agricultural commodities. It shows an increase of 19 percent between 1948 and 1950; in the absence of figures for the year 1949, this total increase was evenly distributed over the two years. During the following four years output fluctuated considerably; it declined by an estimated 4 percent in 1951, recovered by 8 percent in 1952, fell back by 4 percent in 1953, and recovered by 3 percent in 1954. In the latter year agricultural production is thought to have been only slightly above the 1950 level. This poor showing was due not only to weather conditions but also to the depressing influence of the kolkhoz mergers of 1950-51 and the neglect of agriculture in the allocation of resources. The 1954 output in this calculation is 22.5 percent above 1948 which is almost identical with the independently derived figure of 124 in Estimate B.

b. Industry and construction. This sector is believed to have expanded by 15 percent per annum during the years 1948-50; in the following four years progress in industry and construction slowed down to 13 and 10 percent. These figures were arrived at by using the aforementioned indices of Hodgman and Shimkin, ^{1/} tempered by the

^{1/} See p. 35. The following data summarize the annual rates of increase in percent over the preceding year:

	<u>1949</u>	<u>1950</u>	<u>1951</u>	<u>1952</u>	<u>1953</u>	<u>1954</u>
Industrial output (Hodgman)	20.7	15.4	14.9	8.7*	10.4*	n.a.
Mineral consumption (Shimkin)	14.0	13.7	11.1	11.4	8.4	10.0
Ton-kilometers, all carriers	17.5	14.7	12.0	9.0	8.0	7.0-8.0

*Large-scale industry only.

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Table 114. SOVIET GROSS NATIONAL PRODUCT BY ORIGIN, 1948-54

	1948	1949	1950	1951	1952	1953	1954
A. In billions of adjusted 1948 rubles							
Agriculture	178.1	194.3	212.0	203.3	220.2	211.0	218.4
Industry and construction	241.7	278.0	319.7	361.3	397.4	437.1	480.8
Transportation and Communications	53.7	61.8	71.1	79.6	86.8	93.7	101.2
Trade, Finance, Services, etc.	178.8	187.6	196.3	205.1	211.9	218.9	226.1
Total GNP	<u>652.3</u>	<u>721.7</u>	<u>799.1</u>	<u>849.3</u>	<u>916.3</u>	<u>960.7</u>	<u>1026.5</u>
B. In percent							
Agriculture	27.3	26.9	26.5	23.9	24.0	22.0	21.3
Industry and construction	37.1	38.5	40.0	42.5	43.4	45.5	46.8
Transportation and communications	8.2	8.6	8.9	9.4	9.5	9.7	9.9
Trade, finance, services, etc.	27.4	26.0	24.6	24.2	23.1	22.8	22.0
Total GNP	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>
C. Previous Year=100							
Agriculture	100.0	109.1	109.1	95.9	108.3	95.8	103.5
Industry and construction	100.0	115.0	115.0	113.0	110.0	110.0	110.0
Transportation and communications	100.0	115.0	115.0	112.0	109.0	108.0	108.0
Trade, finance, services, etc.	100.0	104.9	104.6	104.5	103.3	103.3	103.3
Total GNP	<u>100.0</u>	<u>110.6</u>	<u>110.7</u>	<u>106.3</u>	<u>107.9</u>	<u>104.8</u>	<u>106.8</u>
D. 1948=100							
Agriculture	100.0	109.1	119.0	114.2	123.6	118.4	122.5
Industry and construction	100.0	115.0	132.2	149.4	164.4	180.8	198.9
Transportation and communications	100.0	115.0	132.2	148.1	161.4	174.4	188.2
Trade, finance, services, etc.	100.0	104.9	109.8	114.7	118.5	122.4	126.5
Total GNP	<u>100.0</u>	<u>110.6</u>	<u>122.5</u>	<u>130.2</u>	<u>140.5</u>	<u>147.3</u>	<u>157.4</u>

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index of total freight turnover; they were used as general yardsticks in determining the amount of GNP originating in both industry and construction. The 10 percent growth between 1952 and 1954 is more an average than a year-by-year estimate of industrial output and construction activity.

c. Transportation and Communications. For the years 1948-50, this sector was moved by the same percentage as industry-construction, viz. 15 percent per annum; for the subsequent years, it was moved by the index of freight turnover. The post-1950 growth of transportation is thus somewhat less than the growth of industrial output. This relationship is the reverse of that prevailing in the 1930's; the change can be attributed to a higher degree of Soviet economic maturity, to a policy of economizing transportation, and -- possibly -- to some lag in the development of the transportation system.

It should be noted that the Estimate A index for industry and construction rises between 1948 and 1954 only 4 percent less than the corresponding indices in Estimate B; the transportation indices of both estimates are practically identical.

d. Services. The contribution of the trade, finance, and services sector was calculated in the following way:

i. For trade, the mark-up was considered as indicative of the value added, and the development of the mark-up in turn was computed by reducing the rise of trade turnover by a percentage representing the cost reduction affected during this period. Total turnover in government and cooperative trade as well as on the peasant markets in 1953 is estimated at 24 percent above 1948 in current prices; ^{1/} in constant prices ^{2/} the increase is 82 percent. There is nothing known about the cost development in trade except that under the Fifth Five-Year Plan, 1951-55, turnover costs in trade were to be reduced by 23 percent. Trade in fact must have been able to economize greatly in recent years since its labor force and outlets seem to have increased little. The 23 percent planned cost savings were applied to the 82 percent turnover increase, yielding a 48 percent growth in the contribution of trade. All other services increased between 1948 and 1953 by 18 percent. This figure excludes labor productivity gains for government workers (and armed forces personnel), in line with US Commerce Department usage.

^{2/} Converted by applying the price index of personal consumption in ibid., p. 9.

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ii. For 1948 trade was given a weight of 14.2 percent in the total service component. The latter increases, consequently, from 1948-53 by 22.4 percent or by an annual average of 4 percent. The growth rate of 1952-53 (3.3 percent) was used to move the series from 1953 to 1954.

2. The Use Pattern. In developing a breakdown by use of the Soviet GNP for years after 1948, three of the four categories, (viz. military expenditures, investment, administration) were computed independently. The fourth category (consumption) was then derived as a residue. The results of the entire computation are shown in Table 15.

a. Military Expenditures. The problem of estimating Soviet military expenditures in constant prices can be divided into two parts: (1) revaluing the explicit armed forces budget in terms of changing prices and price policies, and (2) determining reasonable amounts for covert expenditures. Both tasks are extremely difficult and the results obtained in this report are, at best, only rough approximations. Details of the computation for the years 1948-53 are presented in Appendix B.

No attempt was made to provide a similar analysis of Soviet military outlays in 1954. The amount explicitly budgeted for defense was about 10 percent less than in 1953, the unexplained residuals in the budget rose. Since neither a price reduction nor the state of Soviet weapon technology make a decline of military expenditures in real terms plausible, it was assumed that Soviet preparedness efforts levelled off. An increase of only 2 percent in total spending was allowed to take care of the increased complexity of weapons. Since the national income increased by almost 7 percent between 1953 and 1954, the share of the military component in the GNP declined slightly. However, it should be noted that between 1948 and 1954 the Soviet defense effort grew by 60 percent in real terms.

b. Gross Investment. The figures on gross investment in constant rubles shown in Table 15 cover centrally appropriated investments in fixed capital, additions to working capital, expenditures on capital repairs, collective farms investments that are not appropriated through the Soviet budget, and miscellaneous items such as strategic stockpiling and credit expansion. For some of these items, there exist data in current prices or percentage changes in constant (though unspecified) prices; for other items, estimates have to be made on the basis of hunch and logic in the absence of facts. Details of the estimate of gross investment, including the adjustments of ruble figures to a factor cost basis, are presented in Appendix C.

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Table 15. SOVIET GROSS NATIONAL PRODUCT BY USE, 1948-54

	1948	1949	1950	1951	1952	1953	1954
<u>In billions of adjusted 1948 rubles</u>							
Administration	30.0	30.5	31.4	32.5	33.3	33.6	33.6
Military outlay	91.7	103.2	113.1	121.8	139.3	144.2	147.1
Gross investment	149.6	166.8	192.7	208.3	232.9	250.0	280.4
Consumption	381.0	421.2	461.9	486.7	510.8	532.9	565.4
Total GNP	652.3	721.7	799.1	849.3	916.3	960.7	1026.5
<u>In percent</u>							
Administration	4.6	4.2	3.9	3.8	3.6	3.5	3.3
Military outlay	14.1	14.3	14.2	14.4	15.2	15.0	14.3
Gross investment	22.9	23.1	24.1	24.5	25.4	26.0	27.3
Consumption	58.4	58.4	57.8	57.3	55.8	55.5	55.1
Total GNP	100.0	100.0	100.0	100.0	100.0	100.0	100.0
<u>Index (Previous Year=100)</u>							
Administration	100.0	101.7	103.0	103.5	102.5	100.9	100.0
Military outlay	100.0	112.4	109.4	107.7	114.3	103.5	102.0
Gross investment	100.0	111.5	115.5	108.1	111.8	107.3	112.2
Consumption	100.0	110.6	109.7	105.4	105.0	104.3	106.1
Total GNP	100.0	110.6	110.7	106.3	107.9	104.8	106.8
<u>Index (1948=100)</u>							
Administration	100.0	101.7	104.7	108.3	111.0	112.0	112.0
Military outlay	100.0	112.4	123.3	132.8	151.9	157.3	160.4
Gross investment	100.0	111.5	128.8	139.2	155.7	167.1	187.4
Consumption	100.0	110.6	121.2	127.7	134.1	139.9	148.4
Total GNP	100.0	110.6	122.5	130.2	140.5	147.3	157.4

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c. Administration. As in the case of the estimate of Soviet military expenditures, the calculation of total outlays on government administration are made by adjusting the budgeted amounts and adding reasonable allowances, in this instance, for (1) non-military functions of the MVD-MGB and (2) Party and trade union activities. Details of the computation are given in Appendix C.

d. Consumption. In Estimate A consumption in the years 1949-54 is calculated as a residual. Since the total GNP is derived from output statistics, consumption reflects the ups and downs of agricultural production ^{1/} and necessarily includes all the errors inherent in residual calculations.

The consumption component of the GNP includes both personal and communal consumption. A provisional breakdown for selected postwar years is shown in Table 16. While the figures presented are admittedly very rough, it is believed that they correctly reflect the general trend of personal and communal consumption in the USSR. Since the latter rose more slowly than total consumption (viz. only 28 percent in the period 1948-54 as compared with 48 percent), personal consumption increased even more rapidly -- namely, by almost 53 percent or at a rate of 7.3 percent per annum.

This appreciable increase in personal consumption was not enjoyed by all social groups. In general, the 1948 per capita incomes of urban groups were higher than those of rural groups and the former were increased more in the post-1948 period. An attempt to measure the total and per capita incomes of various social groups in the years 1948 and 1953 is presented in Appendix E.

^{1/} An attempt was made to adjust the estimated stockpiling in such a way that it flattened somewhat the crop fluctuations. In the poor crop year 1951 additions to the stockpile were reduced; in 1953 inventories were probably released to such an extent that the absolute level of stocks declined. But while the liquidation of inventories may have a considerable influence on the market of specific commodities, particularly if it is limited to specific areas, the impact on consumption as a whole is necessarily small. The same is true of the net imports (or exports) of consumers' goods.

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Table 16. BREAKDOWN OF TOTAL CONSUMPTION, 1948, 1950, 1952, 1954

	<u>1948 a/</u>	<u>1950 b/</u>	<u>1952 b/</u>	<u>1954 b/</u>
A. In billions of adjusted 1948 rubles				
Personal consumption	313.1	388.1	430.6	478.2
Communal consumption	67.9	73.8	80.2	87.2
Total consumption	<u>381.0</u>	<u>461.9</u>	<u>510.8</u>	<u>565.4</u>
B. In Percent				
Personal consumption	82.2	84.0	84.3	84.6
Communal consumption	17.8	16.0	15.7	15.4
Total consumption	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>
C. Index (1948=100)				
Personal consumption	100.0	123.9	137.5	152.7
Communal consumption	100.0	108.6	118.1	128.4
Total consumption	<u>100.0</u>	<u>121.2</u>	<u>134.1</u>	<u>148.4</u>

a/ The estimated value of communal services for the civilian population (health, education, etc.) is 66.5 billion adjusted rubles (see Table 9). To this amount must be added the outlay for health and education for military personnel, which is estimated at roughly 8-9 percent of the military subsistence cost or 1.9 billion of the 21.9 billion established rubles allocated for this purpose. In adjusted prices, this amounts to about 1.4 billion. This item was transferred from personal to communal consumption.

b/ The breakdown in these years is estimated by computing communal consumption and deriving personal consumption as a residue. The communal consumption figures were estimated on the basis of the increase in numbers of teachers and doctors in the USSR. While this is a reasonable general yardstick, the results obtained by using such data are subject to a wide margin of error.

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Table 17. ULTIMATE DISPOSITION OF PRODUCT CREATED BY MAJOR ECONOMIC SECTORS, 1948, 1950, 1952 and 1954
(In billion 1948 rubles at factor cost)

Sector	Use	Military Outlay b/				Communal		Personal		Total
		Administration a/	Investment c/	Services d/	Consumption e/	Services d/	Consumption e/			
1948										
Agriculture	—	0.5	1.4	1.6	174.6					178.1
Industry, etc.	6.0	47.8	144.0	10.6	87.0					295.4
Services	24.0	43.4	4.2	55.7	51.5					178.8
Total	30.0	91.7	149.6	67.9	313.1					652.3
1950										
Agriculture	—	0.7	1.9	1.9	207.6					212.0
Industry, etc.	6.3	68.0	185.0	11.5	120.0					390.8
Services	25.1	44.4	5.8	60.5	60.5					196.3
Total	31.4	113.1	192.7	73.8	388.1					799.1
1952										
Agriculture	—	9.9	2.3	1.9	215.1					220.2
Industry, etc.	6.7	93.1	223.6	12.5	148.3					484.2
Services	26.6	45.3	7.0	65.8	67.2					211.9
Total	33.3	139.3	232.9	80.2	430.6					916.3
1954										
Agriculture	—	1.0	2.8	2.1	212.5					218.4
Industry, etc.	6.7	100.1	269.2	13.6	192.4					582.0
Services	26.9	46.0	8.4	71.5	73.3					226.1
Total	33.6	147.1	280.4	87.2	478.2					1026.5

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D. Interrelation of Use and Sector Analysis

The figures developed for the use categories have to agree with the product figures of the sector analysis. To ascertain their agreement in Estimate A, selected data in Tables 14 and 15 are assembled in Table 17. The purpose of this compilation is to indicate how much of the product created -- or to be more precise, of the value added in agriculture, the "industrial sector" (including mining, manufacture, construction, transportation, and communications) and the service sector -- was used for investment, consumption, the military etc. in 1948 and selected years thereafter in absolute figures as well as percentagewise, and how these magnitudes changed over the five-year period.

The findings, insofar as they go beyond those set forth previously, concern chiefly the consumption pattern in relation to the output of industry. The "industrial" component of personal and communal consumption (which in Estimate A includes the value added to consumers' goods and services by manufacturing industries, construction, communications, and transportation, including all passenger transportation) as compared to the industrial component of investment goods and military end-items combined developed as follows:

	<u>Industrial Component of Consumers' Goods and Services</u>		<u>Industrial Component of Investment and Military Goods</u>	
	In bill. adj. 1948 rubles	In Percent	In bill. adj. 1948 rubles	In Percent
1948	97.6	100.0	191.8	100.0
1950	131.5	134.7	253.0	131.9
1952	160.8	164.7	316.7	165.1
1954	206.0	211.0	369.3	192.5

The increase of the figures on the consumption side ^{1/} seems steep in view of the priority assigned in the USSR to investments and armaments. It should be noted, however, that while consumption as a whole was kept down by the slow growth in farm output, agricultural materials such as foodstuffs, fibers, and hides have undergone more intensive processing. At the same time the relatively small sector of consumers' goods of a purely industrial origin (e.g. pots and pans, nails, radios, etc.) has

^{1/} The above figures are not inconsistent with an index of the physical output of some important consumers' goods weighted with the relative weights that Hodgman used for his production index. The index based on the output of cotton and wool cloth, shoes, fish, vegetable oils and canned goods shows, in percent of 1948, an increase of 83 percent by 1954. Needless to say, the increase would be faster if the agricultural raw materials were deducted and, on the other hand, consumers' goods of purely industrial origin included.

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NOTES TO TABLE 17

a/ It is estimated that about 80 percent of administrative expenditures consisted of salaries and wages; the remainder, aside from some imputed rent, consisted of supplies (including utilities). The agricultural contribution to these supplies is negligible.

b/ The services component of the military outlay consists (1) of pay and subsistence for the armed forces (35 billion in all years) and for the military police (1948 - 5 billion; 1950 - 4.5 billion; thereafter 4 billion) as well as the labor cost in operational expenditures (1948 - 2.7 billion; 1950 - 3.5 billion; 1952 - 4 billion; 1954 - 4.2 billion) and in education and research (assumed to be half the amount listed in Table 13, II, 1 .e. 1948 - 1.7 billion; 1950 - 2 billion; 1952 - 2.3 billion; 1954 - 2.7 billion); (2) of an amount of 1 billion rubles for 1948, 1.4 billion for 1950; 2 billion for 1952, and 2.1 billion for 1954 on the theory that not more than 2 percent of the supply value should be imputed to commercial and other services (in the US according to the input-output studies of the Bureau of Labor Statistics the percentage in private investment with respect to trade and insurance is about 4 percent). The agricultural component is estimated at roughly 1 percent of the supply value (for US investment less than 1 percent). The industrial component (including transportation, construction, etc.) is the residue.

c/ The agricultural contribution to investment is estimated at 1 percent (as for military supplies); the service component at 3 percent (slightly higher than for military goods); the industrial component is again the residue.

d/ It is estimated that about 30 percent of communal consumption is for the health service with a supply share of about 25 percent of the outlay (the rest is labor) and a relatively high agricultural component in the supplies; the remaining 70 percent are spent on education and similar activities with a supply share of 15 percent and a low agricultural contribution.

e/ Residual figures obtained by subtracting the values in figure columns 1 - 4 from the total in the last column.

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advanced significantly in recent years. In fact, the much advertised recent "mighty upsurge" of consumers' goods consisted almost entirely of processing more thoroughly virtually the same amount of agricultural materials, and diverting some industrial resources to producing a limited amount of household articles, bicycles, etc.

As previously indicated, (Table 16), communal services accounted for almost 18 percent of total consumption in 1948, but by 1954 their share dropped to 15 percent. It is evident that the contributions of the three sectors differ markedly for personal and communal consumption. Agriculture accounted for almost 56 percent of personal consumption in 1948 and more than 44 percent in 1954; on the other hand, agriculture contributed only a little over 2 percent to communal consumption in these years. Conversely, the bulk of communal consumption comes from the service sector, whereas only 15-16 percent of personal consumption originates in that sector.

E. Conversion of Soviet GNP into Constant Dollars

1. Conversion to 1950 Dollars. ^{1/} In order to compare the ruble estimates of Soviet GNP and its major use components with corresponding figures for the US, an attempt was made to convert each component into constant dollars. Broadly speaking, this conversion consists of calculating appropriate ruble-dollar ratios for each component, applying these ratios to the figures in 1948 adjusted rubles, and deriving the GNP total in dollars by adding the converted components. The calculation of the ruble-dollar ratios poses many difficult problems of comparability and weighting; since the procedure followed necessarily involves considerable guesswork and judgment, the results obtained should be regarded as only a rough approximation which, at best, indicates the general order of magnitude of the dollar value of Soviet GNP.

a. Consumption conversion. The ruble-dollar ratio for consumption is derived from calculated ratios for nine groups of consumers' goods and services -- viz. food, textiles and clothing, household supplies, other manufactured consumers' goods, utilities, rent, transportation, entertainment, and medical-educational expenditures. In each case, representative commodities or services were selected for pricing in rubles and dollars, ratios were calculated for individual items, and

^{1/} The data used to compute ruble dollar ratios were originally in terms of 1950 prices and the results so obtained are presented in Table 18. The method used to convert Soviet GNP figures in 1948 rubles into 1950 dollars is explained in this subsection; the results so obtained were then further converted to 1953 dollars (see subsection E.2 and Table 19 below).

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Table 18. CONVERSION OF SOVIET GROSS NATIONAL PRODUCT BY USE, 1948-54

	Market Prices		Adjusted Prices						
	1948	1948	1948	1949	1950	1951	1952	1953	1954
A. In billions of 1948 rubles									
Administration	32.6		30.0	30.5	31.4	32.5	33.3	33.6	33.6
Military outlay	85.6		91.7	103.2	113.1	121.8	139.3	144.2	147.1
Gross investment	143.1		149.6	166.8	192.7	208.3	232.9	250.0	280.4
Consumption	549.9		381.0	421.2	461.9	486.7	510.8	532.9	565.4
Total GNP	811.2		652.3	721.7	799.1	849.3	916.7	960.7	1026.5
B. In percent									
Administration	3.9		4.6	4.2	3.9	3.8	3.6	3.5	3.3
Military outlay	10.6		14.1	14.3	14.2	14.4	15.2	15.0	14.3
Gross investment	17.6		22.9	23.1	24.1	24.5	25.4	26.0	27.3
Consumption	68.0		58.4	58.4	57.8	57.3	55.8	55.5	55.1
Total GNP	100.0		100.0	100.0	100.0	100.0	100.0	100.0	100.0
C. In billions of 1950 dollars									
Administration	11.6		12.0	12.2	12.6	13.0	13.3	13.4	13.4
Military outlay	15.8		15.8	17.5	18.5	18.7	20.8	21.2	21.6
Gross investment	17.7		17.7	19.9	22.9	24.8	27.7	29.8	33.4
Consumption	35.9		36.6	40.5	44.4	46.8	49.1	51.2	54.4
Total GNP	81.0		82.1	90.1	98.4	103.3	110.9	115.6	122.8
D. In percent									
Administration	14.3		14.6	13.5	12.8	12.6	12.0	11.6	10.9
Military outlay	19.5		19.2	19.4	18.8	18.1	18.7	18.3	17.6
Gross investment	21.9		21.6	22.1	23.3	24.0	25.0	25.8	27.2
Consumption	44.3		44.6	45.0	45.1	45.3	44.3	44.3	44.3
Total GNP	100.0		100.0	100.0	100.0	100.0	100.0	100.0	100.0

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weights were applied to these ratios to get a weighted average ratio for the group. For some groups, e.g. food, the data are sufficiently good to warrant a fairly high degree of confidence in the results obtained; for at least half of the groups, however, the available data and the difficulties involved in weighting make the results liable to considerable error.

The group ratios so computed are in terms of 1948 rubles (market prices) per 1950 dollar. In order to use them for conversion of the Soviet GNP figures in 1948 adjusted rubles, these ratios would have to be expressed in terms of 1948 adjusted rubles per 1950 adjusted dollars. An attempt was made to do so, 1/ but the additional difficulties which it entailed suggested that an alternative procedure would be preferable.

This alternative procedure is based on the fact that the dollar value of the Soviet GNP obtained by converting the ruble figures in market prices would be the same as that obtained by converting the ruble figures in adjusted prices. The differences in the ruble figures are necessarily counterbalanced by the differences in the ruble-dollar ratios.

1/ The calculated group ratios in terms of market prices and factor cost are tabulated below. The figures in the first column express 1948 rubles per 1950 dollar in market prices; the figures in the second column express 1948 adjusted rubles per 1950 adjusted dollar -- that is, the ruble prices used are net of turnover tax and gross of subsidies, and the dollar prices used exclude excise and sales taxes.

<u>Group</u>	<u>Market Prices</u>	<u>Adjusted Prices</u>
1. Food	25.2	12.5
2. Textile and clothing	33.0	18.1
3. Household articles	27.5	9.7
4. Other manufactured consumers' goods	20.9	7.4
5. Utilities	21.5	7.2
6. Rent	3.5	3.5
7. Transportation	7.8	7.5
8. Entertainment	7.0	6.9
9. Health and education	6.7	5.7

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Accordingly, the group ruble-dollar ratios in market prices were used in the following way to convert the 1948 consumption estimates expressed in market prices. Retail sales were converted by using a weighted average ^{1/} of the ratios for groups 1-5; sales on collective farm markets were converted by using the food ratio, which was increased 10 percent to allow for the higher ruble prices prevailing in these markets. Farm income in kind was converted by using a weighted average of groups 1-3, assuming food to represent about 90 percent. Military subsistence was converted by using a weighted average of groups 1 and 2, assuming food to be about three-fourths of the total and allowing for the fact that in the original Bergson calculation the effective ratio of the turnover tax on commodities provided to the armed forces is less than the rate applied to retail sales. The housing and services component of total consumption was converted by using a weighted average of groups 6-8. Lastly, communal consumption, which consists predominanetly of expenditures on health and education, was converted by using the ratio for group 9. The resultant dollar figures add up to \$35.9 billion (market prices) and \$36.8 billion (adjusted prices) for the consumption component of Soviet GNP in 1948. The implied ruble-dollar ratio for this component is therefore 15.3 rubles per dollar (market prices) and about 10.4 rubles per dollar (adjusted prices). The latter ratio was used to convert the Soviet consumption figures in adjusted rubles given in Table 15 (see Table 18).

b. Investment conversion. The ruble-dollar ratio for gross investment is derived in the same general way as that for consumption. In this case, ratios for the following groups of producers' goods were calculated: ferrous metals, non-ferrous metals, chemicals, building materials, energy, industrial machinery, electrical and electronic equipment, and construction. A weighted average of all eight groups

^{1/} The weights used are essentially those developed for 1937 by Janet Chapman (see "Real Wages in the Soviet Union, 1928-52," Review of Economics and Statistics, May 1954.)

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was then computed. ^{1/} This average ruble-dollar ratio (8:1) was applied to the estimated value of gross investment in 1948 in market prices. The resulting dollar figure (\$17.7 billion) was then equated to the estimated ruble value of gross investment in adjusted prices and an implicit ruble-dollar of 8.4 was obtained. The latter ratio was applied to the gross investment figures in adjusted rubles for all years after 1948.

c. Conversion of military outlays. Since no ruble price data for munitions are available and since the procurement, pay, and operational expenditures proportions of total military outlays changed considerably between 1948 and 1954, the conversion of this category of the Soviet GNP had to be made in a somewhat more complicated fashion.

It was assumed that the ruble-dollar ratio for munitions would be similar to that calculated for producers' goods; however, to allow for the fact that the ruble-dollar ratios for the machinery, electrical-electronic equipment, and metals groups are probably more representative of military end-items, the relative weights of these groups were increased. Accordingly, the calculated weighted average for munitions is 7.8 rubles per dollar as compared with 8.1 rubles per dollar for

^{1/} The calculated ratios for each group (in terms of 1948 rubles per 1950 dollars) and the percentage weights used to calculate a weighted average for all producers' goods are tabulated below:

<u>Group</u>	<u>Ratio</u>	<u>Weight</u>
1. Ferrous metals	7.5	14.4
2. Non-ferrous metals	15.6	4.8
3. Chemicals	12.6	7.4
4. Building materials	5.9	14.7
5. Energy	14.0	14.5
6. Industrial machinery	5.0	27.1
7. Electrical-electronic equipment	6.2	3.3
8. Construction	6.5	13.8
Weighted average	8.1	100.0

The weights used for this purpose represent the percentage of value added for each group. These weights were derived from data in the 1941 Plan and RM-924, A Tentative Input-Output Table for the USSR 1948, the computed 1941 value added weights were adjusted by the percentage increases in output for each group.

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producers' goods generally. For the pay and subsistence part of military outlays, a rough ratio (3.0 rubles/dollar) was calculated on the basis of pay and allowances per soldier. For operational expenditures, it was assumed that these outlays were approximately 20 percent labor and 80 percent supplies; the two ratios mentioned above were used in these proportions to derive a weighted average (6.8 rubles per dollar) for this part of military outlays.

These three ratios were then weighted by the estimated proportions of procurement, pay-and-subsistence, and operational expenditures in total military outlays. The resulting ruble-dollar ratio (5.4) was applied to the 1948 military outlay figure in market prices and an implicit ratio (5.8) derived for the 1948 military outlay figure in adjusted prices. The same weighting procedure was followed for later years and the implicit ruble-dollar ratio for military outlays in adjusted rubles was derived on the analogy with 1948. As a result, the ruble-dollar ratio for this component of the Soviet GNP varies from year to year and tends to increase during the 1948-52 period when the proportion of munitions procurement increased. 1/

d. Conversion of administration component. The ruble-dollar ratio for this component was calculated by using the average annual earnings of US civilian government employees (approximately \$3,100 in 1950) and a rough estimate of the average annual earnings of Soviet government workers (about 8,700 rubles in 1948). The latter estimate was based on the relationships of government workers' average salaries to the average salaries of Soviet non-agricultural workers. Since this figure is subject to considerable error and the government administration component itself is a rather heterogeneous category, the conversion in this case is perhaps open to even greater doubt than in the case of

1/ Using the three- ruble-dollar ratios described above, the calculated weighted average ratio for military outlays is as follows:

	<u>Percentage of Military Outlays</u>			<u>Wt. Average Ratio</u>	
	<u>Munitions</u> (R/\$=7.8)	<u>Pay and subs.</u> (R/\$=3.0)	<u>Operations</u> (R/\$=6.8)	<u>Market</u>	<u>Adjusted</u>
1948	30	50	20	5.4	5.8
1949	35	44	21	5.5	5.9
1950	39	40	21	5.7	6.1
1951	47	34	19	6.0	6.5
1952	53	29	18	6.2	6.7
1953	55	28	17	6.3	6.8
1954	55	28	17	6.3	6.8

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the other three components. However, the ruble-dollar ratio used to convert the adjusted ruble figures, viz. 2.5 rubles per dollar, is in line with that used for military pay and, in any case, should be significantly less than the average ratios for consumption and investment.

2. Conversion to 1953 Dollars. The Soviet GNP figures in 1950 dollars shown in Table 18 were converted to 1953 dollars by using the 1953/1950 dollar price ratios for each use component. In calculating these ratios, an attempt was made to adjust the US data as published ^{1/} to fit the use categories developed for the Soviet GNP. In brief, this adjustment consisted of the following:

Dollar figures for US consumption were obtained by taking the data on personal consumption expenditures, subtracting excise and sales taxes, and adding government expenditures on communal services. Gross investment was derived by taking gross private domestic investment and adding public construction expenditures, net foreign investment, and outlays on stockpiling. "Military Outlays" consists of national defense expenditures less stockpiling. "Administration" is calculated by taking government purchases of non-military goods and services and subtracting public construction (which is included in the gross investment category) and government expenditures on communal services (which is included in the consumption category). Needless to say, these adjustments involve certain arbitrary judgments, and the government administration category as so defined is a residual.

The results of converting the Soviet GNP in 1950 dollars by means of the 1953/1950 dollar price ratios calculated are shown in Table 19. This table also gives figures on the US national product in 1953 dollars and the ratio of Soviet to US national products by end-use.

3. Comparison with US National Product. In view of the many uncertainties in the conversion of the Soviet GNP figures and in the comparability of the two national products, quantitative generalizations about the Soviet GNP relative to the US national product cannot be very precise. However, the figures presented warrant drawing the following conclusions:

^{1/} See US Department of Commerce, National Income, 1951 edition, and National Income, 1954 edition.

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Table 19. SOVIET AND US NATIONAL PRODUCTS, 1948-54, IN CONSTANT DOLLARS

Soviet GNP	1948	1949	1950	1951	1952	1953	1954
In Billion 1953 Dollars							
Administration	13.8	14.1	14.5	15.0	15.3	15.4	15.4
Military outlay	17.4	19.3	20.4	20.6	22.9	23.4	23.8
Gross investment	19.9	22.4	25.8	27.9	31.2	33.6	37.6
Consumption	40.4	44.8	49.1	51.7	54.3	56.6	60.1
Total GNP	91.5	100.8	109.8	115.2	123.7	129.0	136.9
In Percent							
Administration	15.1	14.0	13.2	13.0	12.4	11.9	11.2
Military outlay	19.0	19.2	18.6	17.9	18.5	18.1	17.4
Gross investment	21.7	22.3	23.5	24.2	25.2	26.1	27.5
Consumption	44.2	44.5	44.7	44.9	43.9	43.9	43.9
Total GNP	100.0	100.0	100.0	100.0	100.0	100.0	100.0
US GNP							
In Billion 1953 Dollars							
Administration	19.4	21.3	15.0	12.1	12.1	14.4	13.4
Military outlay	13.3	15.1	15.1	34.3	46.1	49.1	41.2
Gross investment	55.0	46.1	63.6	69.9	62.7	60.5	56.1
Consumption	189.3	195.5	208.7	210.1	216.1	224.5	228.0
Total GNP	277.5	278.0	302.4	326.4	337.0	348.5	338.7
In Percent							
Administration	7.0	7.7	5.0	3.7	3.6	4.1	4.0
Military outlay	4.8	5.4	5.0	10.5	13.7	14.1	12.1
Gross investment	19.8	16.6	21.0	21.4	18.6	17.4	16.6
Consumption	68.4	70.3	69.0	64.4	64.1	64.4	67.3
Total GNP	100.0	100.0	100.0	100.0	100.0	100.0	100.0
SOVIET/US RATIO							
Administration	71.1	66.2	96.7	124.0	126.4	106.9	114.9
Military outlay	130.8	127.8	135.1	60.1	49.7	47.6	57.8
Gross investment	36.2	48.6	40.6	39.9	49.8	55.5	67.0
Consumption	21.3	22.9	23.5	24.6	25.1	25.2	26.4
Total GNP	33.0	36.2	36.3	35.3	36.7	37.0	40.4

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a. The growth of the Soviet GNP measured in constant dollars was approximately 50 percent over the entire period 1948-54, as compared with 57.4 percent when measured in constant rubles. On an annual basis, the Soviet rate of growth amounted to 7 percent per year, whereas the US national product increased about 4.6 percent per annum in the period 1948-1953 and 3.4 percent per annum in the period 1948-54.

b. Soviet GNP in 1948 reached a level approximately one-third that of the United States; it is likely that by 1954, the Soviet GNP was around 40 percent of ours. These ratios are based on measuring the respective national products at factor cost. Slightly lower ratios would result if both GNP's were measured in market prices.

c. The ratio of Soviet to US aggregate consumption is appreciably lower than the ratio of the two GNP's. In 1948, aggregate consumption in the USSR was probably little more than one-fifth of that in the US; while this ratio increased subsequently, aggregate consumption was still scarcely more than one-quarter of US aggregate consumption in the past three years. Hence, on a per capita basis, Soviet consumption is currently only about one-fifth of the US level.

d. In contrast to consumption, the ratio of gross investment has been significantly higher than the ratio of the two national products. In 1953-54 gross investment in the USSR was more than half that in the US, despite the fact that the Soviet national product was only about a third as great.

e. Soviet military outlays prior to the Korean build-up in the US exceeded similar outlays in the United States. While Soviet defense expenditures continued to increase thereafter, the increase in US defense expenditures was more pronounced, so that in the past few years Soviet military outlays have represented about half the corresponding outlays in the US.

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V. Soviet Gross National Product: Estimate B

A. General Methodology

As was stated briefly in the Introduction, the methodology of Estimate B differs in certain respects from the methodology of Estimate A. These differences affect principally (1) the weighting of the sectors of origin and end uses of GNP and (2) the conversion into dollars. Most of the estimates of the movement of sectors and end-uses through time are similar in the two cases, although the details of computation are often different.

In Estimate B the base year is 1951. For that year, the Soviet GNP is estimated at market prices along the same general lines as the Bergson 1948 estimate in established prices. However, an attempt is made to distribute the GNP by sectors of origin and end-uses proportionately to a different judgment of the relative factor costs incurred in these sectors and uses.

In the USSR, indirect taxes (i.e., the "turnover tax") represented about 25 percent of the GNP in 1951. They are applied almost exclusively to consumers' goods, especially agricultural products, as a means of equilibrating the level of consumer money incomes with the available supply of purchasable consumers' goods. It is believed, however, that a large part (viz. two-thirds) of the turnover tax represents land rent in agriculture, which can be considered a factor cost, and which properly accrues to the state as sole owner of this land. The state prevents the collective farms from receiving the value of rent on products delivered to it by paying low prices (in relation to the market price) on these deliveries, and by discriminating as between individual farms. The portion of the turnover tax not attributable to factor cost in agriculture is allocated to all sectors proportionately to value added (excluding tax) as an arbitrary measure of unpaid interest, obsolescence and depletion.

B. Soviet GNP in the Base Year (1951)

1. Basic Gross National Product Accounts. The GNP of the USSR is first presented from the point of view of both income and outlays, in terms of 1951 ruble market prices. Retail market prices are used initially because most available Soviet statistics are expressed in these terms.

The accounts for the year 1951 are presented in Tables 20 and 21. On the left side of each account is entered all income, public and private, accruing to individuals, organizations, and the state during the year. The entries are selected so as to avoid double counting while simultaneously taking care not to omit any sources of income. All income is initially included, irrespective of relationship to the performance of productive services. However, transfer items -- that is, income which does not represent payments for productive services, such as pensions and allowances and interest receipts -- have, been segregated and do not enter into the final calculation of GNP.

Table 20. INCOME AND OUTLAYS OF HOUSEHOLDS IN THE USSR 1951
(In billion rubles)

<u>Income</u>		<u>Outlays</u>	
A. Agriculture income		A. Retail sales	
(1) Wages of farm labor	18.1	(1) State and co-operative stores	337.8
(2) Money payments to Collective Farmers (on labor-day basis), salaries, premiums	20.5	(2) Collective farm market	35.3
(3) Net income from sales of farm products	41.1	Total	<u>373.1</u>
(4) Net farm income in kind	143.2	B. Housing (including imputed rent) and services	53.6
Total	<u>222.9</u>	C. Trade union dues	3.7
B. Nonagricultural income		D. Consumption of farm income in kind and military subsistence	157.2
(1) Wage fund	354.8	E. Statistical discrepancy	12.9
(2) Artisan and other current incomes	32.8	F. Total outlay on goods and services	<u>600.5</u>
(3) Military subsistence allowances	14.0	G. Transfer items	
Total	<u>401.6</u>	(1) net savings	
C. Imputed rent of owner occupied dwellings	11.1	(a) Net bond purchases	31.2
D. Total income current earned	<u>635.6</u>	(b) Increment of savings deposits	4.0
E. Transfer items		(c) Other	3.0
(1) Pensions and allowances	36.9	Total	<u>38.2</u>
(2) Student stipends	4.8	(2) Direct taxes	
(3) Interest receipts	5.7	Total transfers	82.5
Total transfers	<u>47.4</u>	Total outlays	<u>683.0</u>
Total income	<u>683.0</u>		

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Table 21. INCOME AND OUTLAY OF GOVERNMENT, SOCIAL, AND ECONOMIC ORGANIZATIONS IN THE USSR, 1951

<u>Income</u>		<u>Outlays</u>	
A. Net income retained		A. Communal services	
(1) Collective farms	6.1	(1) Health care	28.0
(2) State and cooperative orgs.	26.9	(2) Education	63.1
Total	33.0	Total	91.1
B. Allocations to special funds		B. Government Administration	14.1
(1) Social insurance budget	21.4	C. MVD-MGB	17.5
(2) Funds for worker training	8.7	D. Defense	93.4
Total	30.1	E. Gross investment	236.0
C. Indirect taxes and other payments		F. Other outlays	23.0
(1) Enterprises income taxes	7.6	G. Consolidated total value	
(2) Profits tax	47.8	of goods and services	
(3) Turnover tax	247.8	disposed of exclusive	
(4) Miscellaneous	51.9	of sales to households	475.1
Total	355.1	H. Transfer outlays	
D. Allowance for losses of MTS's	-8.0	(1) Pensions and	
E. Consolidated Total charges		allowances	36.9
against current product,		(2) Student stipends	4.8
net of depreciation	410.2	(3) Interest payments to	
F. Depreciation	29.8	households	5.7
G. Consolidated charges against		Total	47.7
total product	440.0		
H. Transfer receipts			
(1) Net savings of households	38.2		
(2) Direct taxes	44.3		
Total	82.5	Consolidated total	
Consolidated total income	552.5	outlay net of sales	
		to households	522.5

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On the right side of each account are entered all expenditures in the economy for the year, again avoiding double counting and omissions. Total outlays, including transfer items, are, of course, equal to total income, since each transaction is entered on both sides of the accounts. Transfer payments are separated on the outlay side, as on the income side. They represent expenditures for which no goods or services are received. The private and socialized sectors of the economy have been entered separately.

The individual items were estimated in a manner similar to that of Bergson. Postwar value data, announced percentage increases, and analogies with the prewar period were used. Contrary to Bergson's procedure, farm income in kind was valued at prices which include the turnover tax, because it is believed that these prices approximate the opportunity cost to the farmer of consuming his own product instead of having to purchase its equivalent.

a. Households. Table 20 presents the income and outlays of individuals in the form of (1) wage and salary payments, (2) private farm plot receipts in money and in kind, (3) income in money and in kind from the distribution of collective farm earnings, (4) earnings of private artisans, (5) subsistence allowances for military personnel, and (6) the imputed rental income of home owners. In addition, the table lists transfer incomes accruing to individuals in the form of pensions and allowances, stipends to students, and interest receipts of government bond holding. The outlay side of the table breaks down the spending pattern of individuals by major categories, including savings and direct taxes.

b. Organizations. Table 21 represents income and outlays of the public sector of the economy, defined to include economic organizations (subdivisions of ministries, consumer and producer cooperatives, and collective farms), social organizations (trade unions, the Communist Party, and so on) and the administrative units of government (the ministries, the Supreme Court, the Supreme Soviet and attached organs, the Council of Ministers and attached organs, and comparable organs in the republican and local governments). The bulk of the income in this table consists of state budget revenues. Only the proportion of collective farm income and outlays retained and expanded by the farm as an organization is included; the portion of farm income distributed to members is entered as personal income in Table 20. The retained incomes of economic organizations are net only in the sense that they remain after the expenses necessary to create them are deducted. The only other incomes of economic organizations entered are those which are transferred to the government in the form of taxes and special funds payments, or transferred to depreciation accounts. The inclusion of any other type of income of these organizations would involve double counting.

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Table 22. COMBINED GROSS NATIONAL PRODUCT ACCOUNT OF THE USSR, 1951

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<u>Income</u>		<u>Outlays</u>	
A. Total income of households currently earned	635.6	A. Total outlays of households on goods and services	600.5
B. Consolidated charges of government, social, and Economic organizations against current product, net of depreciation	410.2	B. Consolidated total value of goods and services disposed of by government, social, and economic organizations, exclusive of sales to households	475.1
C. Net national product	<u>1,045.8</u>		
D. Depreciation	29.8	C. Gross national product	<u>1,075.6</u>
E. Gross national product	<u>1,075.6</u>		

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c. Consolidation. In Table 22 the private and public sector accounts have been consolidated into the GNP account. It will be noted that the transfer payment entries have been dropped at this stage of aggregation. A balance can be achieved without their inclusion, since they cancel in the combination process. The GNP estimate satisfies the conceptual requirement that it be net of transfer payments.

2. Division of Gross National Product by End-Use. Division of Soviet GNP by use is presented in Table 23. Allocation of GNP by use requires that a closer approximation to real cost be attempted. In technical jargon, factor price rather than market price becomes the new standard of measurement. Essentially, the transition to factor price measurement involves the removal of those elements of market price which are not compensated by factor services -- that is, by labor, capital, and rental contribution to production. The principal adjustment required is the reallocation of indirect or excise taxes (turnover tax) with a view to imputing to the end-uses the value of those productive services which must be paid for in a market economy, but are not considered in setting the sales prices of Soviet producing units.

a. Basic classification. The accounts in Tables 20, 21, and 22 show GNP by factor origin and by expenditures on a rather detailed basis. It is now desired to recast the outlay side of the accounts in terms of the large aggregates -- consumption, administration, defense, and gross investment.

In the reclassification, consumption includes retail sales to households, housing, trade union dues, income in kind, military subsistence ^{1/} the statistical discrepancy from Table 20, and communal services from Table 21; administration encompasses the government administration and MVD-MGB entries in Table 21; defense and gross investment are taken directly from the respective entries in this table and the unallocated item is the "other" entry in Table 21.

b. Adjustment for implicit defense expenditures. The breakdown in column A, Table 23, has been derived directly or through the use of historical relationships from official Soviet statistics. In order to achieve comparability with the procedure used by the US Department of Commerce, it is necessary to transfer to the defense category outlays that have been entered under other headings. From consumption are taken 3.0 billion rubles spent for military education; from administration are removed 5.0 billion rubles, which approximates the annual

^{1/} In accordance with Department of Commerce procedure, military subsistence has been included twice, both as consumption and as defense expenditures. In determining turnover tax incidence, only the portion included under defense is assumed to be taxed, since the defense ministry actually pays the tax when it is purchasing food and petroleum products. To assume tax is levied on military subsistence under both headings would overestimate the tax burden.

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expenditures on maintenance and equipment of the estimated 400,000 paramilitary component of the MVD-MGB. The 6.0 billion rubles transferred out of investment and the 3.0 billion rubles transferred out of the unallocated item represent the noninvestment portion of the 11.0 billion rubles estimated outlay for special weapons research and development. The breakdown of column B in Table 23 reflects this transfer process.

c. Factor cost adjustment. If a breakdown of gross national product is to be accurately reflective of resource allocation, the prices used to value the component aggregates should closely approximate alternative costs (the relative economic effort expended to channel resources in a particular direction). The inclusion of turnover tax adds to some degree a noncost element to price. To this degree the tax vitiates the sensitivity of the unadjusted aggregates as indicators of the real division of GNP. Comparison of columns B and C, Table 4, provides a graphic indication of the degree to which the turnover tax, if not corrected, can distort the distribution of the national product. Particularly apparent is the overemphasis given to consumption and the understatement of defense and investment.

Two questions must be answered to adjust the components for turnover tax: what are the taxable portions of each component, and how should the turnover tax be reallocated?

The degree to which expenditure components are subject to the turnover tax is based on a series of assumptions as to the presence of taxable purchases (food, textiles, consumer durables, and petroleum products) within each expenditures category. Except for a 1 percent rate applicable to housing, the general rate of taxation is assumed to be applicable to the taxable shares of all other expenditure categories.

To compute the general rate of taxation, total turnover tax collections for the year, 247.8 billion rubles, must first be divided by the total turnover upon which the tax was assessed, 385.3 billion rubles. It is necessary to deduct income in kind and farm market sales from taxed turnover for the purpose of making this computation, as no explicit tax is levied on these consumption components. Housing expenditures are also excluded, since a much lower rate of taxation is assumed for this category. The result of the above computation is an effective tax rate of 64.3 percent.

It is generally recognized that the turnover tax represents, in part, at least, an economic rent element in market prices. The basic thesis of Estimate B report is that all the turnover tax can be considered to represent economic rent - i.e., the difference between the market price and the specified factor cost such as wages, depreciation, and planned profits, which must be paid by the producers according to

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Table 23. DIVISION OF GROSS NATIONAL PRODUCT OF THE USSR BY END USE, 1951

Use	Value At Established Prices	Value At Established Prices After Adjustment for Defense Exp.	Value After Turnover Tax Adjustment	
	Bill. rubles (A)	Bill. rubles (B)	Bill. Rubles (C)	Percent of Total (D)
Consumption	691.6	688.6	673.2	62.6
Administration	31.6	26.6	28.0	2.6
Defense	93.4	110.4	115.1	10.7
Investment	236.0	230.0	259.3	24.1
Unallocated	23.0	20.0		
TOTAL GNP	1,075.6	1,075.6	1,075.6	100.0

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the rules of Soviet accounting. It is an economic rent because the same level of production would presumably be forthcoming if it were eliminated. By analogy with economies where price does have a direct effect on production, the turnover tax may thus be considered principally as the Soviet counterpart of the value of land rent, interest, depletion, and obsolescence, 1/

The turnover tax also serves as one of the sources for financing state services to agriculture, particularly the operations of the MTS's. Expenditures incurred by the MTS's are partially covered by payments in kind from kolkhozes, but their receipts have been inadequate and the MTS's have chronically had deficits which must be paid by budget subsidies. Available official sources do not draw a direct connection between turnover tax payments and budget subsidies, but they do observe that "kolkhozy receive large material-technical and financial aid from the state. The Soviet state annually spends billions of rubles to supply agriculture with machines, fertilizers, and other means of production, 2/

Known references in official literature do not help in determining the actual breakdown of turnover tax between unpaid costs. Principal reliance is placed, therefore, on the examination of analogies between the Soviet and US economies. In each country the retail prices of rye flour, beef, and cotton cloth have been distributed by factor shares (the proportion of final product) according to the categories of farmer's incomes and processor's and other middleman's receipts for both countries

1/ Interest, depletion, and obsolescence of plant and equipment are not explicitly taken into account in Soviet pricing. The very low prices at which agricultural crops are delivered to the state, in relation to the free market price or to the retail price, and the fact that delivery quotas of crops to the state appear to be discriminatory against farms with good land, leads one to suspect that no allowance is made for land rent in the state prices paid to farmers. Official admissions by Soviet leaders that, for certain crops, procurement prices have not even covered production costs lend further support to this hypothesis. A rent element is, of course, included in the value of agricultural products sold directly by farmers on the free market.

2/ See A. Bacaurin in Voprosi Ekonomika, No. 4, April 1954, p. 29.

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to which must be added, for the USSR, taxes and MTS income in kind. 1/
By assuming that the US distribution of factor choices would prevail in the USSR in the absence of turnover taxes and that agricultural machinery were owned by the farmer, instead of by the state, it becomes possible to reallocate turnover taxes between the two remaining factors of production. The difference in the farmer's share in the two countries plus the explicit MTS share divided by the turnover tax share gives the proportion of the turnover tax compensated by factor services. 2/

On the basis of the foregoing calculations, 75 percent of the tax assessed on agricultural products represents payments to productive factors in agriculture. In order to apply this result to the turnover tax as a whole, it is necessary to make allowances for the portion of tax levied on nonagricultural items. In the 1941 plan, approximately 89 percent of total turnover tax receipts were to originate in organizations marketing farm products or processed foods and textiles. Applying this relationship yields 67 percent as the factor compensated portion of the turnover tax in agriculture. The remaining part of the turnover tax is added to the nonagricultural portion of the economy.

1/ If inter-country comparisons are made for each of the three representative products, the farmer's and middleman's shares are found to be smaller in the USSR. In the USSR the equivalent of the US farmer's share is the explicit farmer's receipts plus the income in kind of the MTS plus an unspecified proportion of the turnover tax share. The equivalent of the US middleman's share is the explicit Soviet middleman's receipts plus the portion of the turnover tax which is not allocated to the farmer.

2/ Symbolically, the calculation is as follows:

$$\frac{F_{us} - (F_r / M_r) = T_{fc}}{T_r}$$

Where F_{us} = US farmers share in percent
 F_r = Soviet farmer's share in percent
 M_r = Explicit MTS share in percent
 T_r = Turnover tax share in percent
 T_{fc} = Proportion of turnover tax compensated by factor services.

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3. Division of Gross National Product by Sector of Origin.

a. Derivation of components. The division of the GNP by end use as described above attempted to recast the outlay side of the accounts in terms of large aggregates. Similarly the present subsection seeks to recast the income side of the accounts in terms of the major aggregates of origin, viz. industry, agriculture, construction, transportation, communication, trade, and services. However, except in the case of agriculture, the income accounts do not permit a direct estimate to be made of income by origin aggregates. Instead, a different approach must be adopted. What is derived is an approximation of a value-added ^{1/} measure of various economic sectors' contributions to GNP. (See Table 24).

The principal ingredient in the value-added computation is the payment to labor engaged in production. The pertinent magnitudes for the Soviet economy are obtained by multiplying the 1951 labor force estimates for industrial branches and economic sectors by the average annual wage for the respective branch or sector, as revealed in the 1941 plan. The profit component cannot be supplied from Soviet profit data, since profits in the Soviet institutional framework are principally a function of resource allocation policy rather than a criterion of managerial activity. The depreciation component of value-added is calculated from 1941 Plan information, but the official depreciation charges have been doubled to adjust for the understatement of capital consumption in Soviet practice. Except for agriculture, the weight for each sector has been determined by the ratio of its combined payroll and depreciation deductions to that for the economy as a whole. The portion of the turnover tax allocated to the nonagricultural area is distributed among sectors proportionately to value added. It does not, therefore, change the weights of the nonagricultural sectors relative to one another.

b. Special calculation of agricultural weight. The outlined procedure cannot be used for computing the agricultural weight, because of the peculiarities of available farm income data. The seasonality of the rural work year and the hidden unemployment apparently prevailing in Soviet agriculture make it necessary to readjust manpower figures to a full-time equivalent basis. Much more difficult of solution is the derivation of an average annual wage. Even in the USSR, agricultural incomes still contain a large proprietary element. The bulk

^{1/} Defined as the additional value imparted to a good at a particular stage of production. It corresponds to the difference between sales receipts and materials and fuel costs, or is equal to wages / profits / depreciation charges.

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Table 24. GROSS NATIONAL PRODUCT OF THE USSR BY SECTOR OF ORIGIN, 1951
(At estimated factor cost)

	<u>Billion Rubles</u>	<u>Percent of Total</u>
Agriculture	337	31.3
Industry, construction	384	35.7
Transport, communications	80	7.4
Trade	58	5.4
Services	217	20.2
GNP	1,076	100.0

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of the earnings of the rural population arises not from money payments for labor on the collective, but from income both in kind and in cash obtained from the consumption or sale of produce grown on the farmer's household plots. Therefore, the agricultural contribution to GNP has been computed from income statistics of this type.

The basic data for determining agricultural income are contained in Table 20 (Income, Section A) and in Table 21 (Income, Section C). All income from farming can be found here except for a considerable portion of the rental return from land. The question of equivalence between land rent and the turnover tax again assumes prominence with regard to the size of agricultural incomes. Those incomes which contain rental elements have been adjusted to suit the premises relating to land rent and MTS service payments. Using the turnover tax-factor cost relationship discussed above, it is estimated that agriculture originates 21.3 percent of the GNP.

C. Growth of the GNP in Constant Rubles

1. Movement of Gross National Product by Sector of Origin. Time series for GNP in constant rubles were obtained by calculating quantity indexes for each sector of origin and computing weighted averages of these indexes. The sector weights were shifted through time in order to give a more realistic picture of actual growth during the entire period. The relative values of the sectors in current prices have changed considerably. Agriculture, for example, has declined, and industry has increased. If the 1951 weights were applied to the 1928-37 period, the growth of the GNP would be overestimated because the slow growing agriculture would be weighted less than was appropriate in 1928-37 and fast growing industry would be overweighted. Conversely, if 1928 weights were used the rate of growth would be underestimated. The shifting of weights makes the analytical meaning of the index unclear, but it helps to give a more realistic picture of growth between individual reference years. 1/

a. Sector indexes. Sector quantity indexes were computed for the following: Agriculture, Industry-Construction, Transport and Communications, Trade, and Services. These indexes were then weighted by the estimated value added in each sector in selected years, expressed

1/ Because of the change in sector weights for pre-war years, 1951 ruble values cannot properly be assigned to the individual sector during the 1928-40 period. If this were done, the sum of the sectors in 1951 rubles would not add up to the total GNP. As a result, it is impossible to show a percentage breakdown of GNP in constant rubles. This, however, is not a serious drawback since the main function of a percentage distribution is to show the relative effort (or factor cost) applied to each use or sector and this is more meaningful in terms of the relative scarcities existing at the time (i.e. in current prices) than in terms of constant prices.

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as a percent of total GNP in current rubles in these years. All sector indexes in Table 25 refer to production in the current boundaries of the USSR. In the case of agriculture, output for the year 1940 was also estimated in postwar boundaries.

i. Agriculture. For the pre-World War II period, the index of agricultural production was taken from Naum Jasny, The Socialized Agriculture of the USSR. This index was linked in the year 1938 with an index computed independently; the latter covers the year 1938 and the post-World War II period, and is based on estimated output of the basic food crops, industrial crops, and principal livestock products. Price weights of the year 1951 were used; these prices include the turnover tax, but exclude transport.

Both indexes represent estimates of agricultural output for sale or for home consumption. Feed for livestock and seed has been deducted from total output, in order to approximate more closely an index of value added in agriculture. Inputs into agriculture from other sectors of the economy were not netted out, however.

ii. Industry and construction. For the period 1928-37, the index of industrial production was taken from Donald R. Hodgman, Soviet Industrial Production, 1928-51. In this index, the output of individual commodities and industries was weighted by the wages paid in these industries in 1934. Within most of the machinery categories, however, individual items were weighted by US 1927 prices. Independent indexes for the year 1940 and postwar years were linked to the Hodgman index.

In constructing these independent indexes, industry groups were weighted by wage bill paid in the industry, 1/ plus amortization charges, or, when this information was not available, by employment. Individual commodities within the industry group were weighted by their respective prices in a base year. 2/ The industrial production index is equivalent to an index of value added in industry in constant prices only if the ratio of value added to gross output remained constant within each industry. Changes in this ratio between industries, however, are partially taken into account by shifting the base for value added weights.

1/ For the 1948-54 period, 1951 employment multiplied by 1941 plan averages wages.

2/ 1951 prices were used as weights during the 1948-54 period.

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Table 25. ^{a/} SOVIET GNP IN CONSTANT RUBLES BY SECTOR OF ORIGIN
1928-54

	<u>Agriculture</u>	<u>Industry Construction</u>	<u>Transport Communications</u>	<u>Trade</u>	<u>Services</u>	<u>Total</u>
A. Billions of 1951 Rubles						
1928	---	---	---	---	---	473
1937	---	---	---	---	---	763
1940	---	---	---	---	---	833
1940 ^{b/}	---	---	---	---	---	883 ^{b/}
1948	296	243	55	42	190	826
1949	311	284	64	47	199	905
1950	343	335	71	52	207	1,008
1951	337	384	80	58	217	1,076
1952	379	425	87	63	222	1,176
1953	358	459	98	68	232	1,215
1954	366	502	103	72	244	1,285
B. Indexes: 1948=100						
1928	89	27	21	94	38	57
1937	108	81	79	125	71	92
1940	105	101	92	116	91	101
1940 ^{b/}	121	101	92	116	91	107 ^{b/}
1948	100	100	100	100	100	100
1949	105	117	116	111	105	109
1950	116	138	130	123	109	122
1951	114	158	145	137	114	130
1952	128	175	159	149	117	142
1953	121	189	179	160	122	147
1954	124	207	187	171	128	156

^{a/} Current boundaries except where indicated.

^{b/} Post-World War II boundaries.

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Defense production is included in the index only from 1937 on. This is not a serious deficiency for the year 1928 when defense production was small. Inclusion of defense production in the 1928-37 index might raise the overall index by 5 to 10 percent. On the other hand, the index for the 1928-37 period does not fully cover the production of small local industries, which are important in food processing, nor forestry production. Since in both of these areas production grew much more slowly than the computed index, their exclusion tends to exaggerate growth. After 1937, omissions of this type are small, and not serious.

No separate index of construction was estimated for prewar years. The value of construction is made up essentially of (1) machinery, equipment, and construction materials, which are included in the index of industrial production; (2) transportation, included under the transportation sector; and (3) services of construction workers, engineers, architects, etc. The latter represents value added in construction. In the absence of reliable data on employment in construction and on the productivity of construction workers, this factor was not estimated. For postwar years, an index of construction was based on estimated expenditures on construction reduced to constant rubles by an appropriate deflator, and was then combined with the index of industrial production.

iii. Transport and communications. The index of transportation is an index of ton-kilometers in railroad, ocean, inland-waterway and motor vehicle transport weighted by the value of goods carried. The prewar series are from Holland Hunter, Soviet Railroad Policy (unpublished); the postwar series are based on independent estimates of freight turnover. For the postwar period, the index of communications was calculated from the number of telegrams and local telephone calls sent, weighted by their average price.

iv. Trade. Soviet figures on the value of state and cooperative trade turnover for the period 1928-40 were deflated by an index of consumers' goods prices. ^{1/} This procedure is appropriate because Soviet data on trade turnover refer almost exclusively to retail trade and exclude producers' goods. However, the prewar index is invalid to the extent that collective farm market trade increased at a different rate than state and cooperative trade.

^{1/} "Real Wages in the Soviet Union," Review of Economics and Statistics, May, 1954.

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For the postwar period, trade was assumed to change with the production of consumers' goods. ^{1/} Consequently, value added in trade is assumed to grow proportionately to the volume of goods being traded. It could also be treated similarly to services and moved with employment, with or without a productivity adjustment. Both methods are extremely rough rules of thumb.

v. Services. The index of services is a weighted average of several sector indices. These represent the categories of education, health, housing and utilities, administration, military, and all others. ^{2/}

^{1/} See Table 36 below.

^{2/} The constituent indexes used in computing the service index were derived as follows:

Education: The education index is a weighted average of the number of teachers, in grades I-IV, V-VII, VIII-X, technicums, and higher education, and of other employees in education. The total number of teachers is distributed between primary, middle, secondary schools, and technicums proportionately to enrollments in these schools. A separate estimate was made of the number of teachers in higher education. Teachers in each grade class were then weighted by the basic salary of that class according to official estimates. Relative weights for teachers are as follows: Grades I-IV - 100; V-VII - 130; VIII-X - 180; technicums - 200; higher education - 500.

Health: The health index is a weighted average of the number of doctors, other health employees, and the number of hospital beds. Doctors' salaries were assumed to be three times the salaries of other health employees, and hospital beds, as an indicator of plant and equipment used in medicine, were given a weight of 1 compared to 3 for all personnel.

Housing and Public Utilities: Services of housing and public utilities are assumed to be proportionate to urban housing space.

Administration: For the years 1928, 1937, 1940, and 1948, expenditures on administration (including one-half of MVD expenditures) were deflated by an index of average wages. Data on wages in administration covered the period 1928-35 only. It was assumed that wages in administration increased at the same rate as average wages for the entire national economy after 1935. The deflated index of administrative expenditures was then adjusted for an assumed labor productivity increase of 2 percent a year. For the 1948-54 period administrative services were arbitrarily assumed to increase by 2 percent a year.

Military: This index is based on total estimated military personnel with an average 2 percent a year allowance for increases in productivity. During the 1948-54 period, productivity increases were related from year to year to the rate of procurement of military end items.

Other Services: These include personal services, entertainment, art, etc; they are assumed to increase at the same rate as the urban population.

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Group weights used are gross value weights and, therefore, include purchases from other sectors. It is assumed that the share of value added to gross value does not vary significantly as between the different service groups. The weights represent primarily labor costs for all groups except housing and utilities where rent is the principal source of value. 1/

b. Sector weights. Each sector index was weighted by the share of the sector in the GNP as calculated from data in current rubles. 2/ The estimates for 1928 and 1937 are net of depreciation. Hoeffding's estimates for 1928 and Bergson's estimates for 1937 were adjusted for consistency with the independently computed estimate for 1951.

Because of the substantial shifts in the relative weights of the sectors through time, it was necessary to change the sector weights. The following weighting was used: for 1928 and 1937: average 1928-37 weights; for 1940: 1937 weights; for 1948-54: 1951 weights.

D. The Movement of GNP by End-Use

For the 1948-54 period, indexes of defense, administration, and investment were computed and applied to 1951 ruble values. Consumption is the residual after deducting the other end-uses from the total GNP. For the prewar period, an independent index of consumption was estimated. Available data did not permit estimates of the movement of the other end-uses.

1. Non-Consumption Categories. Data on investment in current rubles 3/ was deflated by an index of capital goods prices. The result of this procedure is the index of investment in constant rubles in Table 26. Little or no data are available on certain categories of investment, in particular

1/ The basis for the weights is as follows: Education and health: Budgetary expenditures on education and health. Housing and utilities: rent paid or imputed on nonagricultural housing plus estimated expenditures on utilities.

2/ The calculated percentages for the years 1928, 1937 and 1951 are as follows:

	<u>Percent of Total In Current Prices</u>		<u>Industry Construction</u>	<u>Transport Communications</u>	<u>Trade</u>	<u>Services</u>	<u>Total GNP</u>
	<u>Agriculture</u>						
1928	42.3		27.3	7.2	5.6	17.5	100.0
1937	40.0		31.6	7.1	4.3	17.0	100.0
1951	31.2		35.7	7.4	5.4	20.2	100.0

3/ See Appendix F, Tables F-1 and F-2.

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Table 26. SOVIET GNP IN CONSTANT RUBLES, BY END-USE 1928-54

	<u>Consumption</u>		<u>Investment</u>		<u>Administration</u>		<u>Defense</u>		<u>Total</u>
	<u>Percent</u>	<u>Billion</u>	<u>Percent</u>	<u>Billion</u>	<u>Percent</u>	<u>Billion</u>	<u>Percent</u>	<u>Billion</u>	
	<u>of</u>	<u>Current</u>	<u>of</u>	<u>Current</u>	<u>of</u>	<u>Current</u>	<u>of</u>	<u>Current</u>	
	<u>Total</u>	<u>Rubles</u>	<u>Total</u>	<u>Rubles</u>	<u>Total</u>	<u>Rubles</u>	<u>Total</u>	<u>Rubles</u>	<u>GNP</u>
<u>A. Current Prices</u>									
1928	72.6	23.7	22.2	7.2	2.7	0.9	2.5	0.8	32.6
1937	70.5	205.7	20.4	59.5	2.6	7.6	6.5	19.0	291.8
1940	69.0	316.3	14.6	67.0	3.1	14.3	13.2	60.5	458.1
1948	64.2	520.8	21.8	176.9	4.9	39.7	9.1	73.8	811.2
1951	62.6	673.3	24.1	260.0	2.6	18.0	10.8	115.1	1,075.6
<u>B. Billions of 1951 Rubles</u>									
1928									473
1937									763
1940									833
1948	536		179.		26.		84.		826
1949	579		208.		27.		90.		905
1950	637		245.		27.		99.		1,008
1951	673		260.		28.		115.		1,076
1952	734		285.		28.		129.		1,176
1953	742		310.		29.		134.		1,215
1954	765		356.		31.		133.		1,285
<u>C. Indexes: 1948=100</u>									
1928	83		n.a.		n.a.		n.a.		57
1937	104		n.a.		n.a.		n.a.		92
1940	105		n.a.		n.a.		n.a.		101
1948	100		100		100		100		100
1949	108		116		102		106		109
1950	119		137		104		117		122
1951	126		145		106		136		130
1952	137		159		108		153		142
1953	138		173		110		158		147
1954	143		199		112		157		156

n.a. - Not available.

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some of the expenditures on housing, schools, hospitals, and other so-called "social-cultural investments," stockpiling, and gold production. All together, these excluded investments comprised about 28 percent of total Soviet investment in 1951 (in terms of established prices). They are arbitrarily assumed to move proportionately to known investments.

The defense index is a deflated index of defense expenditures. It comprises military personnel, with a slight adjustment for increases in productivity, and military end items and installations. The index of administration was obtained by deflating administrative expenditures by an index of wages.

2. Consumption. Consumption is estimated in two different ways: In Table 26, it is a residual as described above; in Appendix G it is computed independently from production data weighted by market prices. Neither consumption index should be regarded as indicative of year-to-year changes in consumption, because changes in stocks of consumers' goods held in state reserves are not taken into account in either the investment index or the consumption index. Both indices are based on production.

It will be noted that the growth of the residual indexes of consumption is not the same as that indicated by the independently computed index of consumption. Consumption rises 44 percent during 1948-54 in the residual calculation and 62 percent in the other calculation. If the independently computed index were used, the sum of the end-uses would exceed the GNP after 1951 and would be smaller than the GNP before 1951. The difference in 1954 would be about 100 billion rubles. As is explained below, this difference can be explained by methodological considerations, and does not necessarily indicate that one or the other estimate is incorrect.

The reasons for treating consumption as the residual in Table 26 are as follows: (a) because consumption has a much larger value than investment, errors in the investment estimate have a proportionately smaller effect on consumption, whereas errors in a consumption estimate would have a magnified effect on investment; (b) the investment series obtained by the residual method is clearly inconsistent with all available indicators of the volume of investment, showing much too small a growth; (c) the weighting of consumers' goods categories in the independently computed consumption index (Appendix G) is believed to reflect correctly relative market prices, and relative consumer expenditures, but it is methodologically inconsistent with the use of factor cost weights in the estimate of GNP by sector of origin.

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In the sector of origin analysis, two-thirds of the turnover tax is allocated to agriculture. The use of wage bills plus depreciation as weights representing factor cost causes profits and the rest of the turnover tax to be distributed in the same proportion as value added in non-agricultural sectors. Industrially processed consumers' goods are given a smaller weight in the indexes of sectors of origin than in the end-use index of consumption because the raw materials, included in "Agriculture" are highly weighted and grow slowly, while the value added to these materials, mostly in "Industry" and "Trade," is given lower weights. In the sector of origin series, the aggregate weight of the fast rising consumers' goods categories is probably about 15 percent of the GNP compared to about 25 percent in the consumption index. To some extent, a discrepancy also stems from the assumption that value added in the sector of origin series increases proportionately to gross output. Actually, increased processing of consumers' goods has probably increased the ratio of value added to gross value of output. This is not reflected in the weights of the sector of origin analysis.

E. Conversion of the Soviet GNP into Dollars.

1. General Methodology. The procedure adopted for deriving the ruble-dollar conversion ratios (exchange rates) makes use of the scarcity relationships prevailing in both the Soviet and the US economies. Essentially the technique involves the valuing of a weighted, representative list of Soviet commodity outputs and services in both dollars and rubles. The calculation is also performed for US production of the same commodities or services. Conversion ratios can be derived at any stage of aggregation by comparing value of production in the two currencies. By including the US as well as the Soviet production mix, prices can reflect the scarcity relationships prevailing in both economies.

Ratios were first calculated for categories of goods corresponding to sectors of origin. For the most part, however, it was not possible to adjust given market prices in such a way as to represent value added per unit of output. The ratios in Table 27 represent market prices of both final and intermediate products and therefore involve double counting. It is proper, however, to use them in converting categories of Soviet output within which there is little double counting into US dollars.

In order to convert the Soviet GNP into dollars, it was necessary to rework the computed ratios into end use categories. In this analysis, an attempt was made to select only prices of final products. This proved impossible to do in the case of producers' goods, however.

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Table 27. RUBLE-DOLLAR RATIOS FOR SOVIET AND US PRODUCT MIXES, 1951
Sectors of Origin

<u>Major Sectors</u>	<u>Soviet Product Mix</u>	<u>US Product Mix</u>
Industry, Construction	10.8-1	12.6-1
Agriculture	19.6-1	25.8-1
Transportation, Communications	5.0-1	4.1-1
Trade	4.0-1	4.0-1
Services	3.5-1	3.5-1
<u>Industry</u>		
Energy	12.3-1	12.3-1
Electric Power	13.6-1	13.6-1
Solid Fuels	11.9-1	12.4-1
POL	11.4-1	11.5-1
Metals	9.9-1	10.0-1
Nonferrous	15.9-1	16.6-1
Ferrous	9.4-1	9.5-1
Fabricated Metals	8.9-1	9.5-1
Shipbuilding	8.0-1	4.8-1
Automotive Equipment	9.7-1	9.5-1
Electrical Machinery	8.1-1	9.6-1
Electronic Equipment	7.5-1	9.0-1
Chemicals	14.1-1	16.0-1
Construction Materials	12.6-1	14.2-1
Forest Products	6.9-1	10.3-1
Food Products	22.6-1	28.9-1
Manufactured Consumer Goods	15.9-1	13.3-1
Defense Industry	6.0-1	6.0-1
Agriculture	16.6-1	23.3-1
Food Crops and Livestock	16.8-1	24.4-1
Industrial Crops	13.9-1	11.8-1

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2. Calculation of Sector Ratios.

a. Industry, Agriculture, Transportation, and Communications. The calculation of industrial sector conversion ratios involves two levels of aggregation. Ratios are first computed for industrial branches, for example construction materials. Differences in the relative amount of production of individual commodities in the US and in the USSR result in two conversion ratios for each branch. Those are shown in Table 27.

In moving to the next level of aggregation, the combining of industrial branch ratios into an over-all industry ratio, the branch ratios are multiplied by value-added weights. The arithmetic products obtained are summed, and the total is divided by the sum of the weights. The quotient is the industrial sector conversion ratio for each economy. These weights represent the proportions of GNP generated by the respective industrial branches in 1951. A different set of weights has been derived for each economy.

Neither output nor price statistics are available for the defense industry, yet the large size of this branch, particularly in the USSR, compels its inclusion. Fragmentary evidence indicates that a 6:1 ratio may be applicable for this branch.

The agriculture, transportation, and communications ratios are obtained in a manner similar to that employed for obtaining the industry ratio. Only one level of aggregation, however, is required. Since coverage is more complete and gross values more nearly equal to value-added than in the industrial sector, there is little validity sacrificed by summing ruble and dollar values of the components and deriving sector ratios directly from the sums. The procedure is comparable to the first level of aggregation used to calculate the conversion ratios for industry.

b. Construction, Trade, and Services. The ambiguities involved in attempting to define and price units of activity in the trade sector dictate the need for some substitute basis of comparison. Since this sector furnishes services almost entirely personal in nature, it appears suitable to measure "output" in terms of the full-time labor force employed in each sector. The price per unit of output--the average annual wage--is obtained by dividing the total value-added in the sector by the labor force. The same method was used for services. The construction conversion ratio is based on a weighted sample of comparative construction costs in the two economies. Even less than in the case of goods can qualitative differences be minimized in the inter-country comparison of services. In fact, much of the difference in cost may be explained by lack of similarity in the services rendered.

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Table 27A. RUBLE-DOLLAR RATIOS FOR SOVIET AND US PRODUCT MIXES, 1951
End Uses

	<u>Soviet Product Mix</u>		<u>US Product Mix</u>
<u>Consumption</u>	<u>11.9-1</u>	<u>Consumption</u>	<u>13.8-1</u>
Manufactured Consumer Goods	15.9-1	Manufactured Consumer Goods	13.3-1
Food Products	22.6-1	Food Products	27.9-1
Transportation	4.9-1	Transportation	3.9-1
Services	3.5-1	Services	3.6-1
<u>Investment</u>	<u>8.4-1</u>	<u>Investment</u>	<u>10.4-1</u>
Construction	8.0-1	Construction	8.0-1
Producer Goods <u>1/</u>	8.4-1	Producer Goods	10.6-1
Consumer Goods <u>2/</u>	17.5-1	Inventories	15.3-1
Agriculture <u>3/</u>	19.6-1		
<u>Defense</u>	<u>5.3-1</u>	<u>Defense</u>	<u>5.0-1</u>
Procurement, <u>4/</u> Operations, and Maintenance	6.0-1	Procurement, <u>4/</u> Operations, and Maintenance	6.0-1
Pay and Allowances <u>5/</u>	2.7-1	Pay and Allowances <u>5/</u>	2.7-1
Construction	8.0-1	Construction	8.0-1
<u>Administration</u>	<u>2.5-1</u>	<u>Administration</u>	<u>2.5-1</u>
<u>GNP <u>6/</u></u>	<u>9.1-1</u>	<u>GNP <u>7/</u></u>	<u>11.8-1</u>

1/ Represents all industry less food products and manufactured consumer goods.

2/ Manufactured consumer goods plus food products.

3/ Represents accretions to livestock herds. Agriculture conversion ratio is used.

4/ Same as defense sector of origin.

5/ Ratios based on comparative per capita pay and allowance of Soviet and US military personnel.

6/ GNP ratio is an average obtained by weighting the dollar-ruble ratios by Soviet values.

7/ GNP ratio is an average obtained by weighting the ruble-dollar ratios by Soviet values.

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c. Calculation of End-Use Ratios. The calculated ratios for end uses are shown in Table 27A for both the Soviet and US product mix.

The conversion ratios for each of the end use categories represent weighted averages of the conversion ratios of sub-categories. Except as explained in the footnotes to Table 27A, each of the expenditure components is assigned the same ratio as a sector of origin, or as an aggregation of several sectors of origin. The weights assigned to the components of the end uses are based on Soviet and US expenditure data and indicate the proportion of total outlay within each end use expended on a particular component.

3. Conversion of Soviet GNP into Dollars. Conversion ratios for GNP were obtained by weighting end use category ratios by the share of each category in the GNP. Soviet weights were applied to the Soviet mix ratio and US weights to the US mix ratio. The computed GNP ratios are 9.1-1 for the Soviet mix, and 11.8-1 for the US mix. An arithmetic average of these GNP ratios is 10.45-1.

Table 28 shows the growth of Soviet GNP by end use in dollars during the 1948-1954 period. The dollar values of individual end uses, computed from average ratios for these uses, were adjusted so as to add up to the GNP. 1/

Table 29 shows the growth of the Soviet GNP in dollars by sector of origin. It represents an extremely rough estimate. The dollar values of the sectors obtained by applying the sector ratios from Table 27 to the ruble values of Soviet sectors, were adjusted to add up to the GNP computed from the end use breakdown. 2/

In both tables, a constant exchange rate was used to convert Soviet output in all years.

The estimated dollar values of Soviet GNP and its components must be used only with the utmost caution for purposes of international comparisons. This is because dissimilar aggregates are being compared, whether GNP, military production, or any other broad component. There are substantial differences between the two economies in factor endowment, and therefore, in the way factors and products are used. Valuing each country's production in the other country's prices could

1/ The percentage distribution obtained by converting each sector into dollars at its own average ratio, and summing the computed dollar values was applied to the independently computed value of GNP.

2/ The process of adjustment is similar to that described in the preceding footnote.

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Table 29. SOVIET GNP IN CONSTANT DOLLARS BY SECTOR OF ORIGIN, 1928-1954

	<u>Agriculture</u>	<u>Industry Construction</u>	<u>Transport Communications</u>	<u>Trade</u>	<u>Services</u>	<u>Total</u>
A. Billions of 1951 Dollars						
1928	n.a.	n.a.	n.a.	n.a.	n.a.	45
1937	n.a.	n.a.	n.a.	n.a.	n.a.	73
1940	n.a.	n.a.	n.a.	n.a.	n.a.	80
1948	10	15	9	7	38	79
1949	10	18	10	8	40	86
1950	11	22	12	9	43	97
1951	11	24	13	10	45	103
1952	12	27	15	11	47	112
1953	12	29	16	11	48	116
1954	12	32	17	12	51	124
B. Indexes: 1948=100						
1928	89	27	21	94	38	57
1937	108	81	79	125	71	92
1940	105	101	92	116	91	101
1940	121	101	92	116	91	107
1948	100	100	100	100	100	100
1949	105	117	116	111	105	109
1950	116	138	130	123	109	122
1951	114	158	145	137	114	130
1952	128	175	159	149	117	142
1953	121	189	179	180	122	147
1954	124	207	187	171	128	156

result in highly misleading international comparisons. For example, the ratio of dollar expenditures on military output in the US and USSR does not necessarily reflect the relative military effectiveness of military production in the two countries. Comparisons of dollar expenditures on consumption need not exactly reflect relative consumer welfare. The same volume of dollar investments in the two countries may have altogether different marginal productivities. In comparisons of GNP, the above difficulties may well be compounded, and the meaning of the comparison is even more obscure than for components of GNP.

The estimated dollar values of Soviet GNP and its components should not be used to estimate the relative effort expended by the Soviets on the several kinds of economic activity. Only current ruble values are relevant to this question.

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